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Secondary School Science Department Chairs Leading Change

Julie Ann Gaubatz
Loyola University Chicago

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LOYOLA UNIVERSITY CHICAGO

SECONDARY SCHOOL SCIENCE DEPARTMENT CHAIRS

LEADING CHANGE

A DISSERTATION SUBMITTED TO

THE FACULTY OF THE GRADUATE SCHOOL OF EDUCATION

IN CANDIDACY FOR THE DEGREE OF

DOCTOR OF EDUCATION

PROGRAM IN CURRICULUM AND INSTRUCTION

BY

JULIE A. GAUBATZ

CHICAGO, ILLINOIS

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ABSTRACT

Secondary school department chairs are content area specialists in their schools and are responsible for providing students with the most appropriate curricula. However, most secondary school department chairs have limited authority to institute change unilaterally (Gmelch, 1993; Hannay & Erb, 1999). To explore how these educational leaders navigate the change process within their departments, this study examined the change stories of six secondary school science department chairs who had led change attempts. In total, these department chairs shared six stories of successful and four stories of unsuccessful change attempts. The topics of leadership and change were accessed through department chair interviews, document analysis, and a leadership inventory. Department chair leadership was analyzed with Blake and McCanse's (1991) Leadership Grid, and further explored using Yukl, Gordon, and Taber's (2002) detailed characterization of this grid. The change processes described in these department chair stories were analyzed using the frameworks provided by Ely's (1990) conditions of change, and Havelock and Zlotolow (1995) CREATER change stages model. In general, the findings of this study support Havelock and Zlotolow's CREATER model, as well as Ely's conditions of change, with dissatisfaction with the status quo emerging as the essential condition for successful change. This study connects these change process frameworks to specific leadership strategies and behaviors, and uses these connections to illuminate differences between successful and unsuccessful instances of change. These

findings, along with other unanticipated findings emerging from department chair stories of change, such as the adverse influence of contentious resistors and the importance of team construction, add both to the literature on change and leadership, and to the crucial point where these concepts intersect.

CHAPTER I

INTRODUCTION

If schools are to remain relevant and productive agencies within our society, educational leaders must continually modify school structures, curricula, and instructional approaches in response to changes in students' needs, social and economic demands, and educational philosophies (Berube, 1994; Lashway, 2003; Stark, 2002). Educational leaders who misread these changes can misdiagnose organizational needs and choose misguided or poorly implemented solutions (Darling-Hammond, 2001; Kleibard, 2002; McNeil 2005). Although the details of specific educational reforms vary across temporal, cultural, philosophical, and economic situations, the roles leaders play in bringing about change occurs on a broader, more generalizable level.

Few studies have explored this broad level interaction between leadership and change, and none have linked change process models to leadership theories (Herold, Fedor, Caldwell, & Liu, 2008). This qualitative study used a multiple case design to explore patterns of leader-driven reform by examining how secondary school science department chairs implement curricular change. This investigation of six successful and four unsuccessful instances of change connected department chair reports and evidence of leadership behaviors, as first described by Blake and Mouton (1962), and later expanded by Yukl, Gordon, and Taber (2002), to specific stages of change implementation (as described by Havelock and Zlotolow, 1995) and to various change

conditions (as described by Ely, 1990). The connections uncovered in this study between leadership behaviors and the change process, as well as the general findings regarding factors that influence the change process, illustrate patterns that expand the current literature on leadership and change, and enhance guidance for educational leaders as they consider curricular reforms.

Researcher Motivation

Unlike conventional quantitative research, qualitative research involves a significant human element in the data collection and analysis processes (Denzin & Lincoln, 2003). This viewpoint indicates that the researcher's background, interests, and hopes sway the direction of the research, as well as the presentation of the findings. My background has influenced my choice of research topics, and provided me with empathy for my participants and an understanding of the intricacies of their work; it also has provided me with an awareness of my audience and how they interpret research investigations and findings. Although biases may be present, my methodological approach has been designed to lessen the impact of my own predispositions on the subject of science department chairs leading change. Additionally, my background may have enhanced my ability to connect with participants, understand their experiences, and portray findings in a manner that would be engaging to other science department chairs.

I have been a science teacher for 16 years, and a science department chair in three different high schools in three different cities. In each of my department chair positions, I have overseen various curricular and program changes. Some of these changes have been successful, others have not; some changes have been met with mild hesitance, and

others have been met with fierce resistance. Through these experiences, I have learned more about myself as a leader, the power teachers and programs have to enhance the lives of students, and the importance of understanding the dynamics of the change process. My goal as a member of my school community is to organize our system to improve the lives of our students. This goal requires leadership, and it requires thoughtful change; however, both of these phenomena are complex and context-dependent. My motivation for completing this research was to increase my understanding of these broad topics, and possibly provide direction to others who are in positions in which their leadership can bring about meaningful change.

In addition to my experiences as a teacher and a science department chair, I have also been a researcher in the medical field. This background not only provides me with an appreciation of how qualitative research differs from quantitative research, but it also increases my credibility with my science teachers, and with participants in this study. Many science teachers and science department chairs view themselves as both educators and scientists; my background in the sciences and the gravitation of my audience towards traditional scientific presentations of data has influenced the language and the style of my presentation of the findings of this investigation. Although this project operates under a qualitative methodological umbrella and employs qualitative data collection and analysis methods, my background and interests, as well as my participants and proposed audience, have also influenced the shape this of this presentation.

Key Terms

Several terms, as they are used in this study, are explained below:

Science department chair: Secondary school science department chairs often teach zero to four classes a day, and the rest of their work day is spent supervising teachers and coordinating department activities.

Curriculum changes: These changes relate to the goals, objectives, lessons, and activities of specific courses.

Program changes: These changes relate to larger programs within the department, such as the sequence of courses offered to students.

Leadership strategy: Leaders develop strategies when they think about their field and department, or when they plan how to present an idea or approach conversations with others. These strategies are not visible actions, but they can be verbalized.

Leadership behavior: These are actions that department chairs exhibit in their role of department leader; these are visible.

Leadership styles: When strategies and behaviors combine in a coherent narrative, they may give rise to a “style” or approach to leadership.

Innovation: This is a new factor or process that can be introduced into a system.

Change agent: These individuals lead change within a system through formal or informal roles and methods.

Reform: These are changes that amend or alter current practices, approaches, or processes.

Barriers to change: Ely (1990) identified conditions that enhance the chance that a change will be successful. In this study, the absence of these conditions is explored as barriers to the change process.

Science Curriculum Change

Science education in the United States has undergone marked curricular and pedagogical changes due to political, philosophical, and economic pressures over the past century (McNeil, 2005). Similarly to general education, the perceived importance of science education has remained fairly constant over the last century, but the specific details of what is seen as appropriate science education has evolved rather episodically (Kleibard, 2002; McNeil, 2005). Outside pressures frequently affect science curricula through the omnipresent, though valence-shifting, concern about the United States' security and economic position in the world. The Soviets' launching of Sputnik in the mid-20th century is often credited with sparking science education reform, as is the 1983 release of the *A Nation at Risk* report (Kleibard, 2002). More recently, globalization concerns within the U.S. have again prompted calls for science curriculum reform, currently evident in heightened interests in Science, Technology, Engineering, and Math (STEM) initiatives (Clothey, 2010).

As pressures like these develop, science education leaders have often responded by adjusting their curricula and programs to address the changing environments in which they and their students operate. In addition to these large-scale pressures, science education leaders must also revise their departments' curricula and instructional methods to respond to local changes in students' needs. Research suggests the department chair

role consists not only of conceptualizing these changes, but also of guiding the change implementation process (e.g., Feeney, 2009; Tucker, 1993; Wettersten, 1992). The role leaders' play in this process is large: The success or failure of their efforts rests not only on the reform itself, but also on the leadership that ushers in the change (Darling-Hammond, 2001; Furst & Cable, 2008; Pearce & Sims, 2002; Yukl & Tracey, 1992).

The Academic Department Chair Position

The department chair is one of the least researched and understood positions of educational leadership (Gmelch, 2004; Tucker, 1993), and even less has been reported about secondary school science department chairs (Ritchie, 2005). The roles of department chairs in secondary schools vary based on individual school curricular needs, financial resources, and leadership philosophies (e.g., Bliss, 1995; Fenney, 2009; Lucas, 2000; Wettersten, 1994). However, a core commonality among department chairs is that they are frequently seen as content-area specialists in their schools who are expected to strategically implement curricula and programs within their departments (e.g., Fenney, 2009; Hannay & Erb, 1999; Lucas, 2000; Sergiovanni, 1984; Tucker, 1993; Wettersten, 1994; Zepeda & Kruskamp, 2007).

Department chairs must balance the needs of their faculty members with the expectations of their administration; this tension often results in department chairs negotiating between these two sets of stakeholders in order to institute responsive changes within their departments (Gmelch, 2004; Hannay & Erb, 1999). Due to this “middle-man” position, department chairs are rarely able to make unilateral decisions (Tucker, 1993). Many department chairs also balance the desire to serve as a visionary

leader while completing necessary middle management tasks, such as coordinating department functions and evaluating faculty and programs (Stark, 2002; Tucker, 1993; Wettersten, 1992). Serving two invested audiences (faculty and administration) and focusing on leadership along with management duties requires effective department chairs to possess a bank of flexible talents and skills upon which they can selectively draw, depending on context.

In previous reports, academic leaders have stated that they do in fact adjust their leadership styles based on context (Hersey, 1985; Hersey & Blanchard, 1988), and that they recognize the multiple roles that they adopt change based on the concerns or decisions they are addressing (Stark, 2002). For example, one study found that chairs of continually evolving departments felt that visionary leadership was their most effective role, but they also reported that they spent much of their time assuming management roles, such as those needed to coordinate department functions and evaluate faculty (Stark, 2002).

This research project was built on a theoretical foundation that recognized the important role of the department chair in leading school reform through content-specific curricula and programs, and was designed to investigate how department chairs use leadership strategies to navigate the change process while maintaining a balance between conflicting duties and stakeholders. An objective of this investigation was to connect aspects of the change process as described by Havelock and Zlotolow (1995) and Ely (1990) to the leadership styles defined by Blake and Mouton (1962), later expanded upon in The Leadership Grid (Blake & McCanse, 1991) and further detailed by Yukl et al.

(2002), based on science department chairs' narratives and other pieces of evidence that describe their attempt to bring meaningful educational reform through their department's instruction, curriculum, and programs.

The Co-Dependent Nature of Leadership and the Change Process

Department chairs who attempt to bring about educational reform within their departments must manage two co-dependent variables: the change process and leadership. Leadership, according to its most foundational definitions, requires individuals to not simply manage organizations, but also to enact meaningful changes within their institutions (Northouse, 2004). Several leadership theorists have presented similar perspectives, noting that leadership requires management of the status quo balanced with change implementation to provide a reliable, yet evolving structure for the organization (Lee, 1987; Leithwood, 1994). In his 1990 publication, *What Leaders Really Do*, Kotter more strongly states, "leadership... is about coping with change" (p. 86).

Yukl (2002) connects these two aspects of change and leadership by stating, "throughout the change process, the role of the leader is key" (p. 3). This connection between leadership and the change process within organizations is also apparent in change process models, such as Havelock and Zlotolow's *The Change Agent's Guide* (1995), in which the term "change agent" can be interchanged in many situations with the term "leader." "Leadership" is also the final condition stated in Ely's (1990) list of contextual conditions that enhance the probability of successful change.

The connection between leadership and change is also evident in *Diffusion of Innovations* (1995), in which Rogers delineated factors that contribute to whether a change within an organization will be successful, including:

- The perceived nature of the innovation
- The type of innovation-decision
- The communication about the innovation and the change process
- The context of the organization and environment in which the change is to occur
- The actions of the change agent

Rogers' (1995) first factor, the perceived nature of the innovation, includes the impact the change has on people within the organization and the benefits the change might provide. This factor has been incorporated into early stages of multiple change process frameworks, which often refer to the need for leaders to communicate the motivation and the benefits of the change to people within the organization (Fullan & Steigelbauer, 1991; Havelock & Zlotolow, 1995; Rogers, 1995; Zaltman & Duncan, 1977). This factor also relates to Ely's (1990) conditions of change, including participants' satisfaction of the status quo and their perception of incentives that accompany the change. In accord with this factor, this investigation analyzed participating chairs' interview responses and documents to determine how they assessed the need for change and how they communicated that need to their faculty and administration.

Rogers' (1995) second factor, type of decision-making, describes the role of adopters in accepting or rejecting innovations. Some innovations can be accepted or rejected on an individual-by-individual level, while other innovation implementation decisions involve consultation with potential adopters, and still other innovations are (or appear to be) mandated and do not involve potential users in the adoption decision. The level of adopter-involvement in the innovation implementation decision, mirrored by Ely's (1990) condition of participation in the decision-making process, contributes to the context leaders respond to when working to bring about change. This factor emerged as a prominent theme within this study as connected to Ely's conditions of change.

Rogers' (1995) third factor, communication, is impacted by leadership behaviors and strategies, and contributes to the contexts in which changes take place. In this study, leadership strategies and behaviors were evident not only in the change stories department chair describe, but also in the communications they provided for document analysis. Department chairs' uses of verbal and non-verbal symbols proved to be a valuable information source that enhanced my understanding of leadership approaches they use in response to, or in anticipation of, the contexts created by the change process.

Rogers' (1995) fourth factor, context, describes the role the environment plays during the change process. Leadership theories, such as contingency and situational leadership theories (e.g., Fiedler, 1964; Hersey, 1985; House & Mitchell, 1974), state that effective leadership must consider the context in which the leader works. Ely's (1990) conditions of change, the perception of the innovation, the way in which the decision is made to accept or reject an innovation, communication variables, and actions of the

change agent are all integral parts of the context, and their presence and impact in department chairs' stories of change were investigated this by this study.

Finally, Rogers' (1995) fifth factor focuses on the change agent's overt and covert strategies and behaviors used during the change process. This investigation used Blake and McCauley Leadership Grid (1991) and Yukl et al.'s (2002) related leadership behaviors to analyze department chair leadership behaviors in response to the context created by change process stages (as described by Havelock and Zlotolow, 1995) and change process barriers (as described by Ely, 1990).

Deliberate change within an organization is often chaperoned by a leader or change agent (Ellsworth, 2000). This phenomenon complements fundamental definitions of leadership in which organizational change is seen as an expectation (Lee, 1987; Leithwood, 1994; Northouse, 2004; Yukl, 2002), and it also complements change process frameworks in which leadership is an essential component (e.g., Ely, 1990; Havelock & Zlotolow, 1995; Rogers, 1995). Although a few organizational change studies have examined leader behavior during change implementation (e.g., Kotter, 1995), none have attempted to link organizational change theories to leadership theories (Herold, Fedor, Caldwell, & Liu, 2008). Organizational development and school reform literature connects the general concept of leadership with the ability to institute change; this research explored this co-dependent relationship by investigating how science department chairs lead curricular change within their departments.

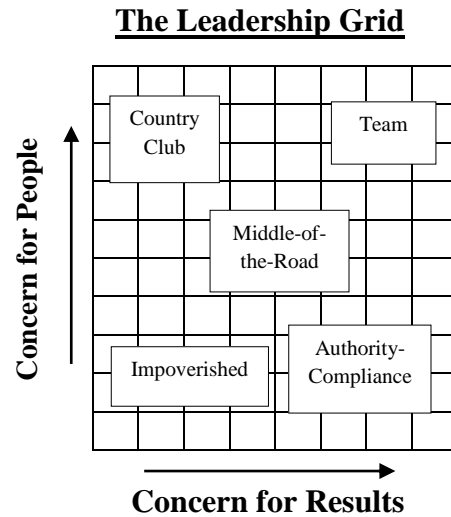
Aspects of Leadership Related to this Investigation

Change agent behaviors influence the effectiveness of organizational change attempts (Ellsworth, 2000). Leadership theories are numerous, and models of leadership have changed as theories about leadership and organization development have evolved. The preponderance of leadership models is due in part to the complexity of the phenomenon itself, but it is also due to the tendency for leadership theorists to ignore past models in favor of presenting their own models (Bass & Avolio, 1994). Currently, despite the many theories published on leadership, there is little consensus on what good leadership is or how to measure it (Bolden, 2004). Different schools of thought that have gained or lost currency with academia and the marketplace (e.g., behaviorism, feminism, social constructionism, post-modernism, complexity theory) have been applied to the study of leadership, resulting in an elaboration of its dimensions, while at the same time obfuscating its core (Middlehurst, 2008). These influences have resulted in the development of multiple models of leadership (e.g., transformational leadership, charismatic leadership, servant leadership), most of which fail to capture leadership's contextual complexities (Yukl & Mahsud, 2010).

This investigation operated from a foundational understanding of multiple leadership theories but maintained a focus on theories that appeared to be most applicable to leaders working within the context of change. Based on this focus, this study attempted to connect leadership constructs from Blake and Mouton's (1962) management theory, further elaborated by Yukl et al. (2002), to specific stages and conditions present during the change process. The Leadership Grid shown in Figure 1 (revised from Blake

and Mouton's original publication by Blake and McCauley in 1991) was based on work conducted at the University of Michigan and Ohio State University in the 1940s and has been used both directly and indirectly in modified assessment instruments, such as the Life Styles Inventory (LSI; Cooke & Rousseau, 1985; Lafferty, 1989). The Leadership Grid analyzes leadership efforts along two axes: Concern for people and concern for tasks. The LSI, shown in Figure 2, further assesses these two axes while incorporating respondents' focus on satisfaction needs, which represents openness to growth, versus security needs, which represents self-protective feelings. Figure 1 further shows Blake and McCauley's (1991) five leadership styles devised from their leadership grid explorations:

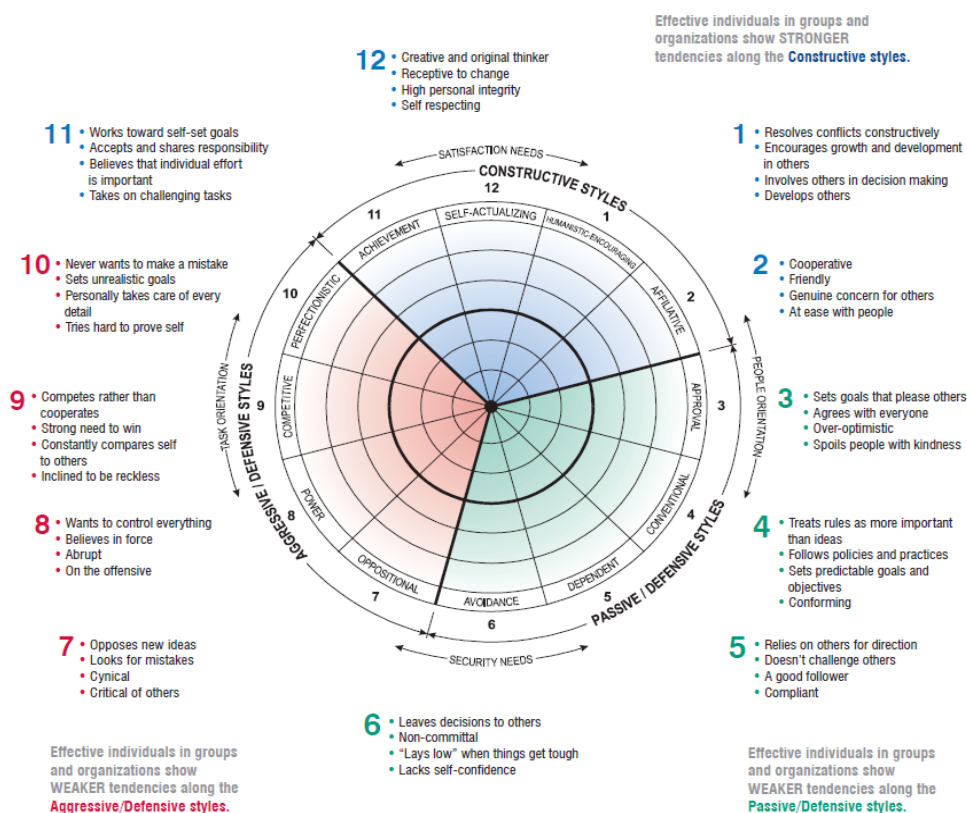
- Country Club, in which the leader provides a people-focused environment in which there is little emphasis on accomplishing tasks;
- Impoverished, in which influence of the leader is all but absent;
- Middle-of-the-Road, in which the leader works to keep the peace and get enough done to justify their position;
- Team, in which the leader is equally focused on people and on task completion; and
- Authority-Compliance, in which the leader is focused on getting the job done without concern for the responses of the people in the system.



Note: From Blake & McCanse, 1991.

Figure 1. The Leadership Grid

A meta-analysis of leadership literature by Judge, Piccolo, and Ilies (2004) revealed that the two leadership axes described by Blake and Mouton (1962) correlated with general leadership outcomes (concern for tasks, $\hat{\rho} = 0.29$, and concern for people, $\hat{\rho} = 0.48$). This meta-analysis also found specific correlations between a concern for people and followers' job satisfaction ($\hat{\rho} = 0.46$), satisfaction with their leaders ($\hat{\rho} = 0.78$), motivation ($\hat{\rho} = 0.50$) and perceptions of their leaders' effectiveness ($\hat{\rho} = 0.52$). Specific correlations were also found between leaders' concern for tasks and followers' satisfaction with their leaders ($\hat{\rho} = 0.33$), their own motivation ($\hat{\rho} = 0.40$) and their perceptions of their leaders' effectiveness ($\hat{\rho} = 0.39$). This meta-analysis supports the robustness of The Leadership Grid's axes as it relates to leadership measurements and outcomes.



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Figure 2. LSI Circumplex

Yukl et al. (2002) built upon the tasks- and people-orientation leadership thesis presented by Blake and Mouton (1962), later expanded on in The Leadership Grid (Blake & McCanse, 1991), by compiling leadership and management behaviors identified in published literature into three “metacategories.” In addition to metacategories based on task and people leadership behaviors, Yukl et al. (2002) created a third metacategory based on their perception that specific change behaviors required a separate grouping. This investigation used these behaviors identified and categorized by Yukl et al. to aid

the analysis of department chair reports of their leadership actions; however, because this study solely investigated leadership that had occurred within the context of the change process, the oblique change-specific metacategory was reabsorbed into the original task and people metacategories.

Based on this adjusted two-category framework, specific behaviors associated with the Task-Behavior metacategory included: 1) Planning short-term activities, 2) Clarifying objectives and role expectations, 3) Monitoring operations and performances, 4) Monitoring the external environment, 5) Proposing an innovation or new vision, and 6) Taking risks to promote necessary changes, with the latter three behaviors transferred from Yukl et al.'s (2002) Change-Behavior metacategory. Specific behaviors associated with the Relations-Behaviors metacategory included: 1) Providing support and encouragement, 2) Providing recognition for achievements and contributions, 3) Developing member skills and confidence, 4) Consulting members when making a decision, 5) Empowering members to take initiative in problem-solving, and 6) Encouraging innovative thinking, with the last behavior reclassified from Yukl et al.'s Change-Behavior metacategory.

This study used the above categories to identify *leadership behaviors* within department chair stories and documents. Leadership behaviors are actions that would be noticeable to an outside observer. Some leadership behaviors are preceded by *leadership strategies*, which were similarly identified in department chairs report as they discussed their leadership-related thought processes, such as planning or reflecting on the purposes of why they took or did not take certain leadership actions. Investigating both leadership

behaviors and strategies provided insight into not only *what* actions department chairs took and *how* they engaged in those activities during the change process, but *why* they chose those specific actions.

In addition to the literature support of the Blake and Mouton (1962) leadership axes, this study selected The Leadership Grid (Blake & McCauley, 1991) as an analytical lens based on the assumption that different leadership foci will be present during different stages of the change process. Most leadership theories view leadership either as non-changing, internal characteristics (e.g., trait theories) or as holistic approaches to the leadership role (e.g., transformational leadership); however, The Leadership Grid provides a flexible investigative tool that allows one person to exhibit multiple, and even overlapping, areas of leadership strategy and behavior. It also provides a broad scope that encompasses more narrowly defined and fixed leadership types, such as transformational or charismatic leadership.

This ability to use The Leadership Grid (Blake & McCauley, 1991) to analyze leadership behaviors as the context evolves during the change process is echoed in recent writings that have observed that leadership occurs within embedded social contexts, and therefore cannot be reduced to an individual's behaviors (Liden & Antonakis, 2009; Yukl, 2009; Yukl & Mahsud, 2010). Leadership itself is negotiable and relational (Gordon & Patterson, 2006) and results from the interactions between people and their environment; therefore both leadership and context must be understood as parts leading to a whole phenomenon (Cole, Bruch, & Shamir, 2009; Fairhurst, 2009; Gordon & Patterson, 2006; Lewin, 1947; Yukl & Mahsud, 2010). Followers help create the

contexts in which leaders enact change, and therefore can influence how leaders behave (Cuban, 1988; Gordon & Patterson, 2006).

Similarly, recent leadership theories emphasize that leadership is situational: Leaders must adapt their strategies as the context in which they work change (Yukl & Mahsud, 2010). Yukl and Lepsinger (2005) illustrated this point by demonstrating how different organizational situations benefit from more traditional, tasks-focused management as opposed to leadership styles that are people-focused, such as those seen in transformational, servant and democratic leadership approaches. This viewpoint matches the focus of this study and supports the choice of analytical tools to explore how different leadership styles and strategies emerged based recursively on the environments created by the change process.

Aspects of the Change Process Related to this Investigation

The goal of this study was to analyze how and why department chairs alter their leadership behaviors in response to, or in anticipation of, various aspects of the change process. Whereas the leadership component of this research used The Leadership Grid (Blake & McCanse, 1991) and Yukl et al.'s (2002) behavior categories as analytical tools, the change process component of this investigation relied on analytic lenses provided by Ely's (1990) conditions associated with successful change and the CREATER model of change process stages (Havelock & Zlotolow, 1995). In both of these change-related frameworks, the leadership of a change agent is essential.

Most change process models build upon Lewin's Unfreeze – Move – Refreeze model, which was first proposed in 1947. These three broad stages of change can be

summarized as 1) an initiation phase, 2) an implementation and continuation phase, and 3) a phase in which the institutionalization of the change is achieved (Fullan, 2001).

Although variations exist in change process models, they present similar profiles which include the following general stages: 1) Identifying the need for a change, 2)

Communicating a vision for what that change will accomplish, 3) Building alliances and gaining acceptance for the change, 4) Implementing the transition, and 5) Sustaining the progression (Whelan-Berry, Gordon, & Hinings, 2003). In their 1995 publication *The*

Change Agent's Guide, Havelock and Zlotolow (1995) presented their expanded stages of the change process, represented by the acronym of CREATER; these stages mirror the more general stages of the change process described in other models (e.g., Lewin, 1947; Fullan, 2001). CREATER stages of the change process include:

0. Care, which is marked by a realization that something needs to be changed.
1. Relate, which focuses on the building of relationships, and the identification of and work with resistors.
2. Examine, which involves planning to address an area of need or an opportunity.
3. Acquire, which focuses on the acquisition of resources.
4. Try, which requires an examination of options, as well as refinements to the decision determined in the Examine stage based on current situational needs.
5. Extend, which is characterized by a widening acceptance of the change.
6. Renew, which involves evaluation and nurturing of the implemented change.

Ely (1990) described eight environmental conditions that enhance the probability of successful change, and these conditions are among the system characteristics change agents could consider during various stages of the change process.

Ely's conditions include:

- Dissatisfaction with the status quo. This refers to members' feelings that their current situation could be and should be different.
- Sufficient knowledge and skills. Members involved with the change must have the knowledge and skills to understand the reason for the change and to implement the change and its associated requirements.
- Availability of resources. There should be enough money, staffing, and equipment for the change to be implemented and carried out correctly.
- Availability of time. There should be enough time to allow participants to learn about and accept the change, and learn how to implement the change, and time should be provided for the change implementation process to occur and take hold.
- Rewards or incentives. Intrinsic or extrinsic rewards help participants gravitate towards the change.
- Participation. Members involved with the change adoption and related processes should be involved in change process decisions to increase their feelings of ownership of the process and the change.

- **Commitment.** Individuals involved with the change, including individuals and groups who are high on the leadership chain, need to clearly demonstrate commitment to the change.
- **Leadership.** Leaders, informal and formal, are needed to oversee the change and encourage members during the change process.

This study approached the analysis of change in a similar fashion as it approached the analysis of leadership: Research-supported frameworks for both aspects of change and leadership were used as primary lenses through which data was interpreted. These frameworks (Blake & Mouton, 1962; Ely, 1990; Havelock & Zlotolow, 1995) were determined to be most relevant to this study based on their professional acceptance, their topical alignment to this study, and their ability to be used flexibly for the purposes of this investigation.

Pilot Study Methods and Results in Support of this Proposed Study

In addition to the literature on leadership and the change process, this study was also informed by a Loyola University IRB-approved pilot study. This pilot study focused on one secondary school humanities department chair who had implemented curricular changes in her department. Through pattern matching, a flow chart was created that adds to the theoretical foundation of this current study (see Figure 3). The model divided the department chair's change story into the various stages described by Havelock and Zlotolow's (1995) CREATER model, onto which agency (i.e., department chair versus teacher responsibility) and Blake and Mouton's (1962) people- and/or task-focused leadership approaches were superimposed.

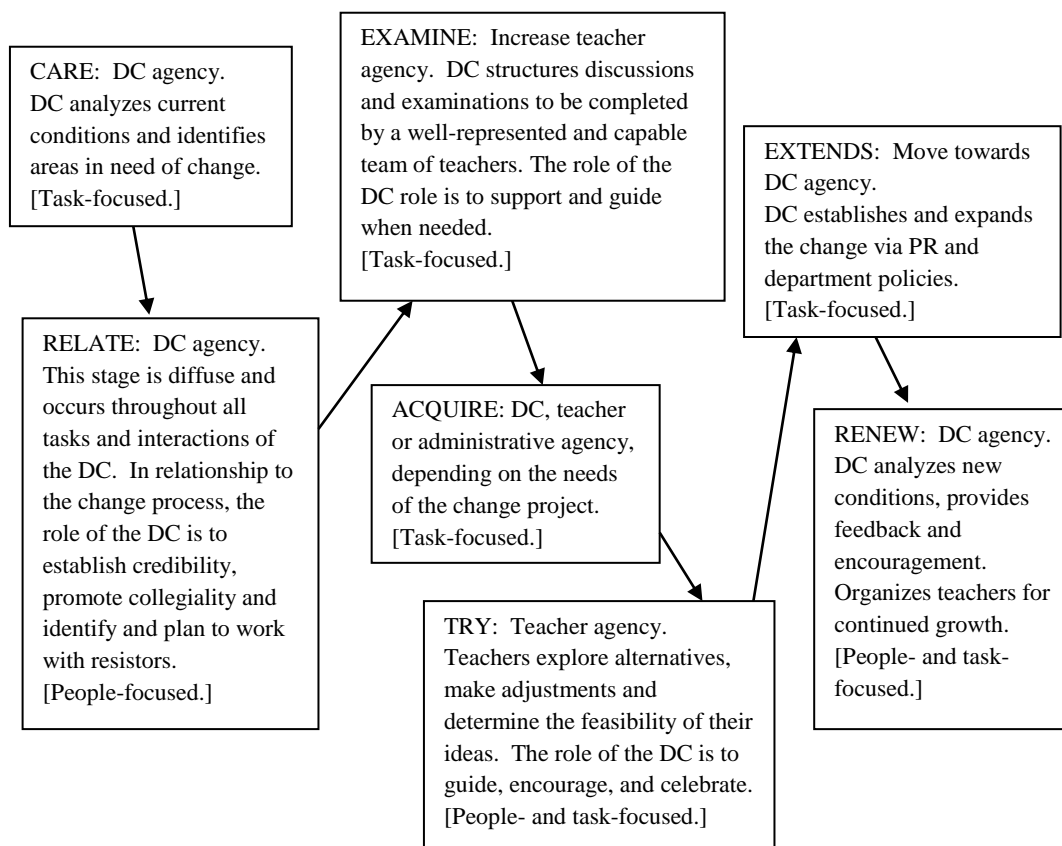


Figure 3. Pilot Study Logic Model

Similar to the goals of the pilot study, the current investigation on science department chairs leading change connected leadership behaviors focused on either tasks or people (as described by Blake & Mouton, 1962) to various change process stages (as described by Havelock & Zlotolow, 1995). This current investigation then further identified leadership behaviors and strategies used by science department chairs in anticipation of, or in response to, a lack of various conditions needed for successful change (as described by Ely, 1990).

Research Questions

The purpose of this investigation was to explore the process through which secondary education science department chairs lead curricular change. The goal was to identify science department chairs leadership behaviors and strategies used (i) when department chairs encountered a lack of conditions necessary for successful change implementation and (ii) during different stages of successful curriculum change processes. It was predicted that department chairs who have implemented successful change would display a discernible, recursive connection between specific leadership approaches (as viewed through Blake and McCanse's Leadership Grid, 1991) and the context created by change process stages (as described by Havelock & Zlotolow, 1995) and by change process conditions (as described by Ely, 1990). To focus the scope of this study, the following guiding research questions were created:

1. How do department chairs describe their experiences with barriers to change?
2. In what ways do department chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
3. Why do chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
4. How do department chairs describe their experiences and roles as leaders during stages of the change process?
5. In what ways do department chairs alter their behaviors and strategies during stages of the change process?

6. Why do department chairs alter their leadership behavior and strategies during stages of the change process?

Data related to these questions was collected through document analysis, a leadership inventory, and three semi-structured interviews with each participating department chair. Pattern matching analysis was used to determine which aspects of Havelock and Zlotolow's (1995) CREATER stages were present in department chair stories of change, while contextual information was analyzed to determine the presence or absence of Ely's conditions for change (1990). Leadership strategies and behaviors were then identified through content analysis and the guidance of The Leadership Grid (1991) and behaviors categorized by Yukl et al. (2002); these leadership findings were then connected to aspects of the change process. This connection between the change process and leadership provided detailed examples of how department chairs lead during the stages of the change process and in response to change process barriers. Department chair stories of successful and unsuccessful instances of change also provided the opportunity to detect whether these analytical frameworks could be associated with the success or failure of a change attempt.

Methodology

This research study operated under the methodological umbrella of multiple case study. The multiple case study design is appropriate for this particular investigation due to the interplay between the phenomenon being studied (leadership) and the context (the change process) in which the phenomenon occurs (Yin, 2003). Cases in this study served

as multiple, individual data sources from which replicable data emerged, allowing for analytic generalization (Yin, 2003).

Because of their responsibility for content-specific curriculum and instruction within their schools, and because the nexus of the two co-dependent variables of leadership and the change process resides within department chairs, the department chairs were the main access point for this investigation. Each department chair's story of change was regarded as a single unit within a multiple case study design (Yin, 2003). Each case was bounded by the department chair, the context of their science department, the change process and focus, and the time during which the change process occurred.

Cases for the proposed study were chosen based on their predicted ability to display a link between successful change implementation and patterns of leadership in relationship with the change process. To help ensure a feeling of comfort, and to help ensure that participants have a solid background in their positions and fields, all department chairs selected for this study were: i) tenured at their current school; ii) had over two years of experience in their current position, and iii) had at least five years of experience in education. Successful and unsuccessful cases of change were identified by self-reports of: i) the percent of the change goals that were met, ii) the percent of teachers that "bought into the change," and iii) whether they would recommend the change to other science department chairs. Other factors that were considered in the selection process include how far along the change process had progressed, the origin of the change idea, and the relation of the change to curriculum reform.

Data sources for this study included three interviews with each of the selected department chairs, document analysis, and results from a leadership inventory (LSI). These multiple sources of data (data triangulation) were obtained through multiple methods (methodological triangulation) which increase the validity and trustworthiness of the study's findings on leadership and the change process (Denzin & Lincoln, 2003).

To identify change stages in department chair stories, data was pattern-matched to stages presented in CREATER model, an analysis method described by Trochim as a comparing patterns that emerge from data to a predicted pattern (as cited in Yin, 2003). Contextual data was analyzed to identify the presence or absence of conditions that enhance change as described by Ely (1990). Leadership behaviors and strategies were identified through content analysis and the work of Yukl et al. (2002), then aligned upon the foundation created by the identified change process stages and contextual factors. Replication logic was attempted as stages of six stories of successful change processes (Havelock & Zlotolow, 1995) and conditions of the context (Ely, 1990) were connected with specific leadership behaviors (Blake & Mouton, 1962). Theoretical replication was attempted as the connections found in successful instances of change were compared to information gained from four stories of unsuccessful instances of change.

After IRB approval was attained, data collection and analysis occurred in the following manner:

1. An email request was sent to members of the Illinois Science Education Leaders Association (ISELA) inviting them to take an online survey on

leading change within science departments. This survey consisted of logic-linked questions that were analyzed through a rubric for participant selection.

2. The use of this selection rubric resulted in a total of eight possible participants who were interested in contributing to this research. Initial contact was made, and six of the eight possible participants provided verbal consent and agreed to continue with the study.
3. Prior to the initial interview, the participating department chairs provided examples of documents they viewed as having importance during the change process. These documents were analyzed as data sources and used as prompts during the interview.
4. An initial semi-structured, open-ended, 90-minute interview with the participating department chairs took place in each department chair's office and was audio-recorded. Prior to the interview, the consent form was reviewed and signed by the participant. Semi-structured interview questions had been created prior to the interview and matched to research questions. Data collected from this interview provided information on the context in which the change took place, the change process, and department chair leadership behaviors and strategies used during the change process.
5. At the end of the initial interview, the participating departments chair were asked to complete the Life Styles Inventory (LSI) on their own and submit the inventory to be scored by Human Synergistics. This inventory was partially built on Blake and Mouton's leadership theory (1962) and expanded into an

analysis of respondents' focus on satisfaction and safety needs (Lafferty, 1989). The results of this inventory provided additional data on the department chairs' leadership styles in general and served as a source for methodological and data triangulation.

6. Interview transcripts and documents were analyzed using the lenses of Ely's conditions of change (1990), Havelock and Zlotolow's change process model (1995), and The Leadership Grid (1991). A summary of the department chair stories and clarifying questions were then developed for the second interview.
7. Once results of the LSI inventory were available, a second semi-structured, 60-minute interview was arranged. During this interview, follow-up questions were pursued, member-checking occurred, and participants reviewed and discussed their LSI analysis.
8. A second round of analysis, this time including the second interview and the LSI data, connected the data to constructs found in leadership and change process frameworks. These multiple sources of data provide triangulation from which generalization of patterns may emerge that connect stages and conditions of successful change processes to leadership styles.
9. A final audio-recorded, 45-minute interview took place to share the resulting data, permit a final member-check, and receive feedback on this study's findings. A gift card was also presented at this time to thank the department chairs for their participation in this study. Insights shared by department chairs on the results of this study added credence to my interpretations of their

stories and provided additional issues that will be explored in the discussion section of this research.

Limitations to this Investigation

A possible weakness of the study is the retrospective nature of the data:

Department chairs' accounts of their experiences are reported in hindsight. This may have weakened the vitality of participants' accounts, whereas collecting the data as the change process occurred might have provided a more realistic picture. However, one of this study's objectives was to hear department chairs' reflections on the change process and their thoughts about how and why they behaved as they did during the change implementation. Although more accurate information about department chair leadership behaviors might have been gathered as the change process unfolded, the insights department chairs shared about their experiences may have proven equally, and possibly more valuable when fleshed out by their reflective, post-hoc analysis of events.

Department chairs who shared their stories for this research chose to participate in this study. This presents another possible weakness: Department chairs who had reflected upon their work and who had an interest in leadership and change would seem more likely to volunteer for this project. Department chairs who felt unsure of themselves, or who were not interested in leadership or enacting change would seem to be less likely to join this project. This reliance on volunteers possibly skewed the participant pool towards department chairs who are more attune to their profession and their ability to impact systems, thus removing department chairs who might have

provided stronger examples of negative cases, or have been better representations of the general population of science department chairs.

Another weakness could have emerged if there had been a lack of consistency in department chairs' stories; however, department chair stories were consistent in most aspects, and differences proved to emphasize the uniqueness of human interactions, as well as point out differing characteristics between successful and unsuccessful instances of change.

A final weakness of this study is the bias I brought to the data collection and analysis. My background as a science department chair who has experienced both successful and unsuccessful attempts at curricular change may have impacted how I interpreted situations and data. However, the use of multiple sources of data and multiple methods of collecting and analyzing data should have reduced the negative effects of preconceptions I may have brought to this project, as would the use of established change and leadership frameworks for my analysis. This weakness may also have brought some strengths to this investigation, such as my empathy for participants' experiences and struggles, and my understanding of the nuanced and complex world in which they work to enhance the educational experiences of students.

Conclusion

In addition to their duties of maintaining the smooth operations of their departments, department chairs are expected to behave as change agents, chaperoning instructional and curricula changes to enhance student experiences and growth (Fenney, 2009; Hannay & Erb, 1999; Lucas, 2000; Sergiovanni, 1984; Tucker, 1993; Wettersten,

1994; Zepeda, 2007). Similar to other academic department chairs, secondary school science department chairs face the challenge of leading curriculum reform within their departments. This research investigated how these department chairs experienced and responded to the change process through their use of leadership strategies and behaviors, and found support for both Ely's (1990) conditions of change and Havelock and Zlotolow's (1995) CREATER model of the change process. In addition, this research connected the lack of conditions for change and stages of the CREATER model to specific science department chair leadership strategies and behaviors as described by Blake and Mouton (1962) and Yukl et al. (2002). This investigation also explored successful and unsuccessful instances of change, and found recurrent patterns in the conditions of change present and stages of the change process; some of these patterns were consistent in both successful and unsuccessful cases, and others appear to be factors that differentiate successful versus unsuccessful change attempts.

Findings from this study help illuminate the processes and strategies department chairs use to bring reform to school systems through curriculum and program changes, and may provide guidance for department chairs as they perform their role as educational leaders within their schools. The results of this study point towards recommendations about how educational leaders should approach the change process, possibly leading to enhanced student experiences.

CHAPTER II

LITERATURE REVIEW

This study examined how science department chairs in secondary schools lead curricular reform within their departments. This investigation connected leadership strategies and behaviors of department chairs as described Blake and Mouton (1962) and further elaborated by Yukl et al. (2002) to stages of the change process as described by Havelock and Zlotolow's (1995) CREATER model, as well as to change process barriers as derived from Ely's (1990) conditions of change. This research project operated on the theoretical understanding that change and leadership are codependent phenomena; therefore, this study explored department chair leadership strategies and behaviors that emerged in response to, or in anticipation of, (i) contextual barriers to change and (ii) change process stages. The investigated research questions included:

1. How do department chairs describe their experiences with barriers to change?
2. In what ways do department chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
3. Why do chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
4. How do department chairs describe their experiences and roles as leaders during stages of the change process?

5. In what ways do department chairs alter their leadership behaviors and strategies during stages of the change process?
6. Why do department chairs alter their leadership behavior and strategies during stages of the change process?

To investigate these questions, six science department chairs shared documents they viewed as relevant to their change attempts, participated in a series of interviews, and completed a leadership inventory (Life Styles Inventory; LSI). Resulting data related to the change process was analyzed using frameworks provided by Havelock and Zlotolow's (1995) CREATER model and Ely's (1990) conditions of change, whereas science department chair leadership strategies and behaviors were analyzed through the use of The Leadership Grid (Blake & McCauley, 1991) and related leadership behaviors (Yukl et al., 2002). Centered on the goals and research questions of this study, as well as on the emerging themes uncovered by this research, this chapter provides an overview of the literature on department chairs, change models, leadership, science curricula reform, and issues affecting school reform efforts.

Department Chairs as Educational Leaders

Secondary schools in the United States exist in a limited variety of organizational structures, with most headed by a principal or administrative team, under which department chairs supervise teachers within a specific content area (Siskin, 1990). This arrangement, which organizes teachers into discipline-based departments, first gained prominence in the 1930's (Tyack, 1974). As teachers over subsequent decades became more educated and specialized, department chairs evolved into content-focused

instructional leaders, sometimes supplanting school principals who earlier served that role (Pellicer, 1990; Peterson, 1989).

Under most permutations, department chairs are content-area specialists in their schools who are expected to behave as change agents, implementing instructional and curricula changes as necessary within their departments (Fenney, 2009; Hannay & Erb, 1999; Lucas, 2000; Sergiovanni, 1984; Tucker, 1993; Wettersten, 1994; Zepeda, 2007). Although little research has explicitly explored the leadership roles of secondary school department chairs, reports do suggest that department chairs are viewed within their organizations as instructional leaders (Pellicer, 1990; Wettersten, 1992), and investigators approach them with the expectations that they are leaders within their schools (e.g., Hall, 1984; Ritchie, 2005). However, school-to-school studies of department chair behaviors fail to support these leadership expectations: Chairs actually engage in relatively little leadership activities, possibly due to the structure of the job as defined by individual schools, by the context in which a department chair works, or by the department chair's personality traits (Bliss, 1995; Hall, 1984). Work by Ritchie (2005), for instance, found that although science department chairs expressed leadership goals, the way they interacted with their faculty did not reflect these leadership aspirations.

In possible contrast to common findings on secondary school department chair roles, studies of department chairs in higher education identified multiple activities that could be considered leadership or management behaviors, depending on their context. Some of these behaviors include arranging faculty professional development, evaluating faculty and programs, setting schedules, running meetings, overseeing budgets, and

conveying information to both their administration and their faculty (Gmelch, 2004, Gmelch & Miskin, 1993; Stark, 2002; Wettersten, 1994). Hirokawa (1989) found that the skills effective chairs possessed were resource, climate, and image management, as well as faculty development, and Stark (2002) found that the primary roles department chairs reported when discussing their work were those of facilitator, initiator, agenda-setter, coordinator, advocate, sensor and standards-setter. These activities could be categorized as management skills if the goal of the activity was to maintain the smooth operations of the department; however, they could alternatively be classified as leadership behaviors if the goal was to enact change within the department.

In many secondary and post-secondary school settings, department chairs face a balancing act, with the needs of faculty within their departments on one side and the expectations of their administrative supervisors on the other (Gmelch, 2004). This position requires department chairs to negotiate with both their faculty and their administrators in order to institute change (Gmelch, 2004; Hannay & Erb, 1999). Being placed between two, sometimes competing, sets of stakeholders, result in department chairs rarely having the freedom to make unilateral decisions (Tucker, 1993). This impacts their ability to institute change within their departments and may require them to use specific and strategic leadership skills to implement successful change.

Serving two, sometimes conflicting audiences (i.e., faculty and administrators) and striving to meet expectations of academic and instructional leadership while carrying out managerial tasks requires department chairs to possess flexible, context-dependent, and strategically implemented skills. Research by Hamm (1994) and Stark (2002), for

instance, found that department chairs who have successfully implemented change report that they adjust their leadership styles based on context, and that they recognize that the multiple roles they adopt evolve based on the concerns or decisions they address. Although neither Hamm's nor Stark's research compared the reports of chairs who had successfully versus unsuccessfully attempted to initiate change, this ability to determine whether a situation calls for leadership action or a managerial focus could be a possible differentiating variable in their success.

The expectation for department chairs to exhibit leadership behaviors requires them to not simply manage their departments, but also to enact meaningful changes within their institutions (Northouse, 2004). This emphasis on implementing change as an integral role of leadership still requires department chairs to manage the operations of their departments in order to provide a reliable structure, while ushering in change to provide an evolving and responsive organization (Lee, 1987; Leithwood, 1994). If a portion of the responsibility for enacting change within school systems is delegated to department chairs, then an investigation of leadership within the context of change could lend insight into the effectiveness of school reform processes.

The Change Process

Basic definitions of leadership refer to the expectation that leaders enact meaningful change (Kotter, 1995; Northouse, 2004; Yukl, 2002); therefore, for researchers to fully understand the actions of leaders, they must also understand the nature of change. The link between leadership and the change process is salient in many change process models that assign leaders either explicit or tacit agency for provoking

and shepherding change (e.g., Fullan, 2001; Havelock & Zlotolow, 1995; Rogers, 1995; Zaltman & Duncan, 1977). Havelock and Zlotolow's work, *The Change Agent's Guide* (1995), capitalized on this connection by describing the roles leaders, or change agents, play during the change process, such as a catalyst, process-helper, solution-giver, or resource-linker. Although the connection between leadership and change is generally described in theories of change, no research has connected specific change process models to specific leadership theories (Herold et al., 2008).

There are many viewpoints from which to examine the change process, and researchers and theorists have developed various models in attempt to describe change as seen from these diverse perspectives (Ellsworth, 2000). Some change process models address the stages of the change process (Havelock & Zlotolow, 1995; Lewin, 1947), and some suggest ways of approaching change by considering the stakeholders affected by or interested in the change (Fullan, 2001; Hall, Wallace & Dossett, 1973), while others focus on whether the change will be successful (Ely, 1990; Rogers, 1995). This study applied frameworks offered by Ely's conditions of change (1990) and Havelock and Zlotolow's *The Change Agent's Guide* (1995) to examine change processes as led by secondary school science department chairs.

Ely's (1990) Conditions of Change

The first change framework used in this study is Ely's (1990) conditions of change. Ely's eight conditions can be used to analyze organizational contexts to identify variables that might present enhancements or barriers to leaders shepherding the change process. Ely views the presence of these conditions as enhancing the probable success of

a change attempt, while the absence of these conditions presents barriers to the change process (Nawawi, Ayub, Ali, Yunua, & Tarmizi, 2005). In this study, department chair reports were analyzed to determine if they encountered these conditions of change during their change attempts, or if the absence of these conditions presented surmountable barriers to the change process. This study also explored how chairs adjusted their leadership styles in anticipation of, or response to, change barriers. Ely's conditions of change include:

1) Dissatisfaction with the status quo. If members of a system are satisfied with current conditions, their motivation to accept change will be lower than if they felt dissatisfied with their current conditions.

2) Sufficient knowledge and skills. Leaders need to ensure their organizational members understand and will be competent in the roles they are expected to play in the change process.

3) Availability of resources. This condition refers to funding, support personnel, and equipment.

4) Availability of time. This condition is similar to the condition of availability of resources. Most organizational changes require time for participants to learn, perform, and reflect on their roles in the change process. Time must also be allotted for members to accept the change, and for the change to become part of the organization.

5) Rewards or incentives. In this condition, Ely recognizes the important role that motivation plays in the change process. Members within organizations can be motivated by internal and external rewards.

6) Participation. This condition refers to members' participation in decisions during the change process. Participation of members in decision-making processes requires leaders to increase communication to educate, motivate, and involve members. This participation increases the members' perception of ownership of, and investment in, the change process.

7) Commitment. Members of the system and stakeholders need to be committed to the change. Leaders should express their support of the change.

8) Leadership. Various types of leaders can initiate and guide the change process. Leaders need to support and encourage members of their system during the change process, and provide professional development as needed.

Ely (1990) identified contextual conditions that enhance the probable success of change attempts. According to Ely, the absence of these change-enhancing conditions presents barriers to the change process: "The opposite of the facilitating conditions are hindrances that prevent implementation" (1990b, p. 11). This study therefore views the absence or opposites of Ely's conditions for change as change process barriers that may need to be redressed or remediated by the change agent to enhance the chance of a successful change attempt.

Ely's (1990) conditions of change are based on and supported by observations in a wide-range of settings in which change has been attempted. Multiple research projects have investigated these conditions, and from the variety of findings, it appears that these conditions are context-dependent. For instance, Surry, Jackson, Porter, and Ensminger (2006) determined that the characteristics of the participants in a change implementation

attempt impacted how they viewed the importance of different change conditions.

Other research indicates the valuation of Ely's conditions vary based on the type of organization in which the change occurs and the form of the innovation (Bauder, 1993; Ensminger, 2008; Jeffrey, 1993; Ravitz, 1999; Read, 1994).

Surry et al. (2006) determined that although change process participants valued all of Ely's eight conditions for change, differences emerged in the perceived importance of the conditions based on the organizational setting, and the age and educational background of change participants. In educational settings, participants perceived the availability of resources, their ability to participate in the decision-making processes related to the change, and their own knowledge and skill levels as the most important factors in successful change processes. This study also determined that older participants felt that the availability of resources was more important than their younger counterparts. Additionally, Surry et al. found that participants with higher educational levels placed less importance on the condition of skills and knowledge, perhaps because they had more confidence in their abilities. The combination of the finding presented in this study indicates that department chairs should consider contextual factors, such as the age and educational background of their faculty members, when strategizing methods that could increase the probability of successful change implementation.

Ensminger and Surry (2008) demonstrated that change participants also valued Ely's (1990) conditions differently based on whether the change was attempted in K-12, higher education or business settings, and also that these valuations changed depending on whether the change attempt was a technological innovation or a process innovation.

Resources for the technological change appeared to be more of a concern for participants in the two educational settings than those in the business setting, possible due to the funding issues. This underscores that leaders must understand the context in which change occurs can impact change participants concerns and perceptions. Most salient to this current study, participants from all three setting stated that they though Ely's condition of dissatisfaction with the status quo to be the most important when embarking on a non-technological process change.

Additional research into Ely's (1990) conditions for change identified important conditions for successful change; however, these findings lack consistency from one investigation to another. These different findings between studies appear to be due to contextual factors, such as the different innovation foci of the change process. An example of this variety in findings can be seen in the results of four dissertations. Two of these dissertation investigated technology-themed innovations; the findings of these two studies contain some similarities, and yet some differences. Bauder (1993) determined that teachers' successful adoption of the use of computer-enhanced instruction differed from unsuccessful adoption of computer-enhanced instruction in six of Ely's (1990) conditions of change, with the strongest difference appearing in the condition of knowledge and skills, participation in the decision-making process, and commitment of their leaders to the change. Ravitz's (1999) investigation into teachers' use of the internet mirrors Bauder's (1993) findings in that the condition of knowledge and skills predicted the success of this particular change implementation ($r = 0.34$); however, unlike

Bauder, Ravitz (1999) also found that the condition of dissatisfaction with the status quo had a similar predictive value ($r = 0.35$).

Two additional dissertations continue this variation in findings on Ely's (1990) conditions of change. When investigating peer-coaching, Jeffery (1993) found that the availability of time and resources, along with leadership, were viewed by teachers to be crucial conditions for successful implementation of change. This is supported by Read (1994) who found that teachers viewed leadership as the factor that most impacted their ability to participate in shared decision making in their school; however, time and resources were viewed by teachers as absent conditions. Taken together, these studies imply that the variations in how participants view Ely's (1990) conditions of change is dependent on the subject of the change, characteristics of the change participants, and the context in which the change occurs can impact the relevance of Ely's conditions of change.

In a similar focus as this current project, Stein (1997) connected Ely's (1990) conditions of change to phases of the change process. He suggested that the conditions of dissatisfaction with the status quo, commitment, and leadership are most important when a change is being considered; resources and knowledge and skills are conditions most likely to affect the ability of the implementation to take hold; and participation in the decision-making process, time, and incentives for participants impact the implementation process.

This current project grew in part from the foundation of research summarized above on Ely's (1990) conditions of change. Research into these conditions of change

consistently supports the importance of these conditions, however, with variations in valence. This variation may be due to contextual factors, such as the characteristics of the change participants, the type of innovation, or the general environment in which the change attempt occurs. In this particular project, the overarching context was the change process led by science department chairs in both successful and unsuccessful change attempts. This project identified conditions that appeared to be necessary to successful change as described by department chairs, and uncovered connections leadership behaviors used by science department chairs to create specific conditions that were lacking during the change process.

Havelock and Zlotolow's (1995) CREATER Model

The second change process model used in this study was Havelock and Zlotolow's CREATER model (1995), which outlines stages of the change process. Whereas Ely's (1990) conditions were used to analyze department chairs' experiences of change process conditions that influenced the success of their change efforts, the CREATER model was used to analyze the stages implicit in chairs' change process stories.

The CREATER model focuses on the sequential stages of the change process, and therefore provides a broad frame of view. The foundation of the CREATER model is Lewin's Unfreeze-Move-Refreeze model (1947), which was reworked in 1984 by Huberman and Miles into the phases of Initiation, Implementation, and Continuation/Routinization. The Unfreeze/Initiation stage consists of preparing the organization for the possibility of change, such as by educating potential adopters on the

need for a change and by procuring resources, whereas the Move/Implementation stage consists of enacting the change and providing adopters with resources, on-going training, and support, and the Refreeze/Continuation/Routinization stage involves fine-tuning the change based on feedback and providing continuing support for adopters (Ellsworth, 2000). Research, including the 1974 Rand Change Agent Study, supports the salience of these three main change stages (as cited in Fullan, 2001); however, a study of principal leadership found that the critical stage of “planning” was lacking from this model (Reinhard, Arends, Kutz, Lovell, & Wyant, 1980).

Havelock and Zlotolow’s (1995) CREATER model expands these basic stages of the change process and adds the missing planning stage. The CREATER stages, as described by Havelock and Zlotolow, include the following elements:

0. Care. In this stage, a possible change agent realizes a change would benefit the organization; this realization may be noticed by the leader only, or by the leader as well as other members of the system. During this stage, leaders conduct needs assessments, including evaluations of the climate of the organization. It would seem that during this stage, leaders should examine Ely’s (1990) conditions for change assuming that they may need to compensate for missing prerequisite conditions. Attention to Ely’s conditions should help change agents strategize actions in the remaining stages of the change process and plan how to mitigate anticipated barriers to the change process.

1. Relate. This stage focuses on leaders’ efforts to build relationships with stakeholders and identify resisters. This stage often occurs concurrently with the CARE and EXAMINE stages. It seems that this stage presents another opportunity for leaders

to address Ely's conditions of change, such as by addressing participants' satisfaction with current conditions and by involving them in change-process decisions. In this stage, the change agent's actions and communication are essential, as is leader patience. As Rogers (1995) advised, leaders must also understand the context in which they are attempting to initiate a change and understand the needs and interests of their members; these considerations will help leaders work with possible resisters and address participants' insecurities. Leaders must gain the trust of the participants if they are to accept the proposed innovation and the related change process.

2. Examine. During this stage, change agents continue to analyze organizational needs and assess the context as they, and possibly other participants, plan to address contextual conditions uncovered in the CARE stage. This may be approached as identifying a problem or accessing an opportunity. It seems that this stage presents an occasion to consider Ely's (1990) conditions regarding the availability of resources and time, and to develop a plan that addresses deficiencies in participants' knowledge and skill levels. In addition, change agents should consider Ely's conditions that address involving participants in decision-making related to the change process, and incorporating incentives for participants into the change process plan.

3. Acquire. This stage focuses on the acquisition of assets needed for the change, and connects with Ely's (1990) conditions that focus on the need for adequate time and resources, which influence the context in which the change is to occur.

4. Try. This stage is the most creative stage in the CREATER model, and it requires an examination of options and refinements of details so the eventual change fits

the needs of the current situation. A pilot of the intervention data and feedback may be integrated with updated approaches to the change.

5. Extend. This stage is characterized by a widening implementation of the change and a broadening organizational acceptance of the change. Leaders must ensure that progress continues by providing professional development, oversight, and resources to those who are implementing the change. This stage corresponds to Ely's (1990) conditions of leadership, participants' knowledge and skills, and the availability of resources and time.

6. Renew. This stage involves the evaluation and nurturing of the change. At this point, the need for new changes may be discovered, and the CREATER process would return to the beginning stages of the cycle. If leaders determine that the change implementation is progressing successfully, they should communicate that success to members (Rogers, 1995) and provide support and continued professional development to ensure continued success of the change (Ely, 1990). Change agents should also continue to attend to all eight of Ely's conditions of change until members see the innovation as the new status quo.

Havelock and Zlotolow (1995) also discuss four roles that change agents can play during the change process. These include the role of (i) catalyst, which allows the change agent to prompt members to consider or see the need for a change; (ii) solution-giver, which requires the change agent to know how and when to propose solutions to problems as perceived by members of the system; (iii) process-helper, which provides a broad role for leaders to help members in various areas of the change process; and (iv) resource-

linker, which requires change agents to be able to access the funds, equipment, and knowledge for members to make the change successfully.

This study investigated secondary school science department chairs' stories of change and analyzed their stories with the CREATER model as a lens. This analysis found that most stages of the CREATER model were present in department chair stories of successful change, and that successful stories of change had similar characteristics to unsuccessful stories of change in the early stages of the CREATER model, although key differences occurred in the EXAMINE stage. In addition, this study was able to connect different stages of the CREATER model with various leadership behaviors as described by Blake and Mouton (1962) and further developed into leadership behavior categories by Yukl et al. (2002).

Possible Ancillary Change Process Models

Although other models describe various aspects of the change process, they were determined to be either not as applicable to the analysis of department chair stories as Ely's (1990) conditions for change or Havelock and Zlotolow's (1995) CREATER model, or similar enough to these models as to present only modest gains to the investigation. However, these other models could be accessed to further explore stories of department chairs leading change in their departments. Three models that may have ancillary analytic applicability to future studies within this same vein of this investigation include Kotter's *Leading Change* (1995), Zaltman and Duncan's *Strategies for Planned Change* (1977), and Hall, Wallace, and Dossett's *The Intended Adopter* (1973).

Kotter's *Leading Change* (1995) presents eight steps for organizational change in a user-friendly, "how-to" manner for leaders. These steps were derived from an analysis of factors that were common to failed organizational change attempts; the logic that followed this analysis of failed change attempts was that leaders should avoid these identified common pitfalls by converting the negatively worded mistakes into positive instructions. The resulting sequential steps of leader activities include:

1. Establish a sense of urgency
2. Create a guiding coalition
3. Develop a vision and strategy
4. Communicate the change vision
5. Empower employees
6. Generate short-term wins
7. Consolidate gains and producing more change
8. Anchor new approaches in the culture

Kotter's (1995) steps are occasionally used as a framework for analysis of successful and failed change attempts; they are mostly used in a retrospective nature and most studies indicate that the organizations studied have their own special characteristics that veer slightly away from Kotter's vision (e.g., Uys, 2010). For instance, slight deviations from Kotter's steps were uncovered in a study on change within higher education in which participants felt that these eight steps were more applicable to business than academic settings (Spencer & Winn, 2004). Other studies have found that

Kotter's model lacks important elements found in change processes (e.g., Gordon, 2003 as cited in Malm, 2008).

Zaltman and Duncan's *Strategies for Planned Change* (1977) focuses on identifying, categorizing, and overcoming members' resistance to change. This model categorizes cases of resistance as Cultural, Social, Organizational, or Psychological, and then further subdivides each of these categories. Although resistance was the main avenue barriers to change were exhibited in department chairs' stories of change implementation, Zaltman and Duncan's work delves into details of resistance that require data beyond what this study was designed to provide. Limited data could lead to inaccurate conclusions, and adding this entire model as a lens of analysis would have diffused this study's focus on leadership within the context of change while not correspondingly increasing the applicability of the findings.

Although this study did not investigate resistance as an isolated phenomenon as described by Zaltman and Duncan (1977), it did explore how department chairs anticipate and respond to this contextual variable. Leaders can predict and mitigate resistance by strategically addressing Ely's (1990) conditions of dissatisfaction of the status quo, participants' level of knowledge and skills, the availability of time and resources, the use rewards and incentives, and the involvement participants in decisions during the change process.

Another change model related to this study is Hall, Wallace, and Dossett's *The Intended Adopter* (1973) which describes adopters' responses and development as the change process progresses. This model, the Concerns-Based Adoption Model (CBAM),

has two lines of analysis: Stages of Concern, which describes adopters' psychological responses to change, and Levels of Use, which describes adopters' evolving behavior as they adjust to change. As adopters move through the change process, their concerns evolve, starting with, "What is the change?" to "How will this change impact me? Why is it taking so long? Is the change working?" and eventually, "Is there a change that might work even better?" Adopters also progress through stages of behaviors that mirror these concerns, with some adopters displaying drastically different rates of progression. In this model, adopters advance from being not interested in the change, to wanting to learn about the change, becoming open to the change, implementing the change, and then actively trying to make the change even better. Progressing through these various stages of concerns may take years, as many systemic changes take three years or more to be fully implemented into the system (Loucks-Horsley, 1996).

This current study found that adopter response to change was the primary contextual factor that influenced the success of change implementation, and therefore is of crucial importance; however, the focus of this study was how department chairs respond to the context created by the change process, such as adopter's responses, but not on the adopters themselves. In addition, this study's main access point was the department chair, and the reflective nature of the study did not provide adequate data for a complete CBAM analysis. Department chair interviews described faculty members at various psychological and behavioral stages during the change process, but a full CBAM analysis was not feasible at this time due to limited access to change process participants. In this particular study, a CBAM analysis would not contribute markedly to the

understanding of how department chairs lead educational reform from their own point of view. However, aspects of the data that connect to adopters' psychological and behavioral response may be related to the stages described in CBAM without accessing the entirety of the model for analysis. This may be an area of future research based on the findings of this study, which indicate the important role of adopters in successful change attempts.

Finally, one popular change model that was not used in this study is Fullan's *The New Meaning of Educational Change* (2001). This model overlaps partially with Ely's (1990) conditions of change, but focuses more on how change agents gain support from various stakeholders, such as parents, the school board, students, teachers and general community members (Ellsworth, 2000). Because this study was designed to use change process frameworks presented by Ely (1990), using a model that contains aspects of this primary models would not be functionally additive. In addition, as predicted, department chairs had little direct connection to stakeholders addressed by Fullan's model due to their positions and roles within the school system and the level of change pursued.

Leadership

Leaders can influence factors that contribute to whether a change effort will be successful (Rogers, 1995). These factors, in turn, contribute recursively to the context to which a change agent must respond. Change agents can also influence conditions necessary for successful change, such as those described by Ely (1990), and conversely, these conditions may also alert leaders to change barriers they must mediate. Finally, as indicated in the title, *The Change Agent's Guide* (Havelock & Zlotolow, 1995),

leadership is the nexus of change in the CREATER model. Because leaders are an integral part of the change process, the purpose of this study was to analyze science department chairs' leadership strategies and behaviors concurrently with their experience of the change process to further increase our understanding of not only the role of the department chair, but also the interplay between leadership and change.

Despite the preponderance of leadership theories, researchers have not reached consensus on what good leadership is or how to measure it (Bolden, 2004). Bass and Avolio (1994) noted that the proliferation of leadership theories seems to be due not only to the complexity of the topic, but also to a desire to ignore previous leadership work and to forge one's own path with a new approach; the result is a plethora of leadership models to fill the literature. Although a wide range of academic and popular trends (e.g., behaviorism, feminism, social constructionism, post-modernism, complexity theory) have been applied to the study of leadership, they have led to fractured views about what constitutes its fundamental essence (Middlehurst, 2008). Whereas theorists informed by these trends have developed multiple models of leadership that accent its various facets (e.g., situational leadership, transformational leadership, contingent leadership), observers have argued that most of these models have failed to capture leadership's contextual complexities (Yukl & Mahsud, 2010).

Few studies have analyzed leader behavior during change implementation (e.g., Kotter, 1995), and none have linked change process models to leadership theories (Herold et al., 2008). This study attempts to fill this gap by connecting the core constructs of Blake and Mouton's (1962) leadership theory, further expanded on by Yukl

et al. (2002), to the specific stages in the change process described by Havelock and Zlotolow (1995) and to specific change process barriers described by Ely (1990). The Leadership Grid (Blake & McCanse, 1991) was chosen as the primary leadership analytical tool for this project due to its support in the literature, its ability to subsume other leadership model constructs, and its predicted applicability to leaders who work within the context of change.

Supplementing the use of The Leadership Grid (Blake & McCanse, 1991), this study also operated from a foundational understanding of general leadership theories. Connections to the literature that were thought to be possibly applicable for this secondary level of analysis included the examination of the impact of “social distance” on leadership styles and change process management (e.g., Cole, Bruch & Shamir, 2009), the comparison between department leaders’ rhetoric versus their actual leadership actions (Bolden, Petrov, & Gosling, 2009; Fairhurst, 2009; Pondy, 1978), and an application of chaos/complexity theory lens (Fris & Lazaridou, 2006; Morrison, 2010). However, none of these leadership analysis angles proved applicable to the change process stories as described by department chairs as the data emerged during this investigation.

On the other hand, foundational literature on the power-relations between leaders and their followers, first published by French and Raven in 1959 (as described by Braynion, 2004), did aide the analysis of how department chairs in this study gained the cooperation of teachers in their departments. Leaders can access five different types of power as they work with their followers; all of these forms of power, however, are

relational, and rely on followers to “give” power to their leaders. The first two types of power that leaders can establish with their followers is that of Reward and Coercive Power; these forms of power rely on leaders having the ability to provide followers with rewards or punishments for their work within the organization. Legitimate Power is obtained when followers feel that their leader has the right to control their work based on the fact that their leader has earned their position within the organization. Leaders that are able to gain the admiration of their followers possess Referent Power, and leaders who are viewed as bringing knowledge, talent, and skills to their positions are viewed as having Expert Power. In this particular investigation, the first two forms of power are largely absent due to the structure of school systems, but the latter three become particularly important as department chairs work to gain the trust of their teachers and attempt departmental change.

The Leadership Grid (Blake & McCanse, 1991; Blake & Mouton, 1962)

The Leadership Grid (Blake & McCanse, 1991) is an updated version of the management grid created by Blake and Mouton in 1962. This original 1962 construction grew from the work of University of Michigan and Ohio State University leadership investigators in the 1940’s and 1950’s, especially the work of Fleishman who proposed two dimensions to leadership behavior: Initiating Structure and Consideration (Bernardin, 1971). The Leadership Grid, through which one can analyze leadership behaviors and strategies, has become a standard in leadership studies and has been used as a foundation for leadership assessment instruments, such as the Life Styles Inventory shown in Figure 2 (LSI; Cooke & Rousseau, 1985; Lafferty, 1989). As shown in Figure 1, this grid

consists of two axes of leadership focus: The Y-axis measures a focus on concern for people (consideration) and the X-axis measures a focus on concern for results or tasks (initiating structure). The Leadership Grid's "concern for results or tasks" relates to how leaders achieve organizational goals, whereas its "concern for people" maps the extent to which a leader attends to relationships with individuals within an organization. Using The Leadership Grid, observers can chart the type and valence of leadership behaviors as being focused on people, tasks, or a combination of both. Blake and Mouton defined five leadership styles, correlated to different regions of this grid (see Figure 1):

The first leadership style, Authority-Compliance, maps a high concern for results with a low concern for people. A leader using this style places heavy emphasis on task completion and little emphasis on people or relationships. Communication with subordinates mainly consists of instructions, and members may generally view this leader as controlling and overpowering.

On the opposite side of the continuum is the second leadership style, Country Club Management. The Country Club Management style is high on concern for people and low on concern for results. Leaders using this style are more concerned with interpersonal relationships as opposed to achieving goals. Whereas they may create a comfortable and friendly work environment, the members of their organization, Blake and Mouton (1962) held, may not be productive.

The third leadership style, Team Management, is high on concern for people and results. This leadership style places the same level of emphasis on both tasks and relationships. Leaders are able to develop a committed work group to advance the

institution's goals and develop relationships of trust and respect with their team members. Blake and Mouton (1978) stated that this was the most effective style of leadership regardless of the context or situation.

The fourth leadership style, Impoverished Management style, is the opposite of the Team Management style. Leaders employing this style demonstrate little concern for tasks or interpersonal relationships. Characteristics of this leadership style include little communication and contact with followers, and may appear withdrawn or indifferent in the work environment.

The fifth leadership style is the Middle-of-the-Road Management style. This style is mapped in the middle of each axis, indicating that leaders of this type exhibit a moderate concern for people and results. Such a leader avoids conflicts and is satisfied with modest levels of outcomes and interpersonal relationships.

Judge, Piccolo, and Ilies (2004) assessed the usefulness of The Leadership Grid as a predictor of leadership success through a meta-analysis of published leadership literature. Their findings revealed that the two axes described by Blake and Mouton (1962) correlated with general leadership outcomes (concern for tasks, $\hat{\rho} = 0.29$, and concern for people, $\hat{\rho} = 0.48$). In addition, Judge et al. also found specific correlations between leaders' concern for people and followers' (i) job satisfaction ($\hat{\rho} = 0.46$), (ii) satisfaction with their leaders ($\hat{\rho} = 0.78$), (iii) motivation ($\hat{\rho} = 0.50$), and (iv) perceptions of their leaders' effectiveness ($\hat{\rho} = 0.52$). Specific correlations were also found between leaders' concern for tasks and (i) followers' satisfaction with their leaders ($\hat{\rho} = 0.33$), (ii)

their own motivation ($\hat{\rho} = 0.40$), and (iii) their perceptions of their leaders' effectiveness ($\hat{\rho} = 0.39$). Taken together, this meta-analysis supports the robustness of The Leadership Grid's axes as it relates to leadership measurements and outcomes, and demonstrates the not only the usefulness of the constructs of the grid for leadership analysis, but also the possible interplay between the two axes.

This current study created codes connected to specific task- and people-focused behaviors as identified by Yukl et al. (2002). Yukl et al. reviewed leadership and management literature to create "metacategories" that mirrored Blake and Mouton's (1962) axes of a focus on tasks and a focus on people, and also addressed their perception that specific change-focused leadership behaviors required their own separate category. Due to the fact that this current study focused on leadership during the change process, behaviors listed in this third metacategory were recategorized into either the task or relationship metacategories.

Based on the work of Yukl et al. (2002) and the goals of this study, specific behaviors associated with the Task-Behavior metacategory include: 1) Planning short-term activities, 2) Clarifying objectives and role expectations, 3) Monitoring operations and performances, 4) Monitoring the external environment, 5) Proposing an innovation or new vision, and 6) Taking risks to promote necessary changes. Behaviors four, five, and six were reallocated by this investigation from Yukl et al.'s Change Behavior metacategory.

Specific behaviors associated with the Relations-Behaviors metacategory include: 1) Providing support and encouragement, 2) Providing recognition for achievements and

contributions, 3) Developing member skills and confidence, 4) Consulting members when making a decision, 5) Empowering members to take initiative in problem-solving, and 6) Encouraging innovative thinking. The last behavior listed was transferred to the Relations-Behaviors metacategory from Yukl et al.'s (2002) Change Behavior metacategory.

Advantages of the leadership grid. In addition to the support found in the literature for the use of Blake and Mouton's (1962) axes, a further advantage of using The Leadership Grid (Blake & McCauley, 1991) over other popular leadership models is that it provides a broad lens through which one can view leadership; it therefore can encompass other leadership models. For example, the transformational and servant leadership styles often exhibit behaviors that would score high for concern on people. The Leadership Grid, consequently, does not exclude the analysis of transformational or servant leadership styles; however, using the transformational leadership model or the servant leadership model as the foundation of this study would exclude leadership styles that were not people-focused due to their narrower focus. This broad applicability of The Leadership Grid permits a more inclusive view of leadership correspondent with the openness of the proposed study to a variety of leadership behaviors.

A final advantage of using The Leadership Grid (Blake & McCauley, 1991) as an analytical tool in this investigation is that it can be applied to leadership behaviors as contexts evolve. Although other leadership models are frequently cited in academic and popular publications, Blake and Mouton's (1962) leadership lens was chosen for this study based on the expectation that different leadership foci will be more prevalent

during different stages of the change process. Most other theories view leadership either as static, internal characteristics (e.g., trait theories) or as holistic embodiments of leadership (e.g., transformational leadership). Despite Blake and Mouton's (1978) argument that a single optimal leadership style applies across all situations (Team Management Style), the use of their grid as an analytical tool permits leadership to be explored as change contexts evolve and as barriers to change are encountered. Used as an analytic lens, The Leadership Grid can reveal leaders' propensity to exhibit multiple, and even overlapping, areas of leadership focus under diverse circumstances. This arguable need for flexibility in leadership matches the results of a study that found that department chairs conceptualize their role in terms of human interaction and in terms of the formal structures of their positions (Bolman & Deal, 1997).

This study was designed to investigate how leadership styles differ during various stages of the change process and in response to change barriers. The expectation was that leaders would adjust their leadership behaviors in response to, or anticipation of, change process contexts. This prediction mirrors recent assertions that leadership occurs within embedded social and situational contexts, and cannot be reduced to isolated behaviors (Laden & Antonakis, 2009; Yukl, 2009; Yukl & Mahsud, 2010). As research by Yukl and Mahsud found, leaders must adapt their strategies as the contexts in which they work change, a precept further supported by Yukl and Lepsinger's (2005) finding that some organizational situations benefit from more traditional, task-focused management approaches more than from people-focused styles. Despite the camp controversies and the presence of compromising data pertaining to models that connect leadership to

context (e.g., Geir, 2009; Schriesheim, Tepper, & Tetraault, 1994), the intuitive interplay between leadership and context is highlighted in leadership models such as the Contingency Model (Fiedler, 1967), the Path-Goal Model (House & Mitchell, 1974) and Situational Leadership (Hersey, 1985; Hersey & Blanchard, 1988).

More explicit connections have been made between leadership and the context created by followers within a system. Gordon and Patterson (2006) stated that leadership is negotiable and relational; it results from the interactions between people and their environment; therefore, both must be understood as parts leading to a whole phenomenon (Cole, Bruch & Shamir, 2009; Fairhurst, 2009; Gordon & Patterson, 2006; Lewin, 1947; Yukl & Mahsud, 2010). Followers play a large role in creating the context in which leaders enact change, and therefore can influence how leaders behave (Cuban, 1988; Gordon & Patterson, 2006). This was demonstrated by in a study by Lim and Ployhart (2004) which determined that different leadership approaches were found to be more or less effective based on the relationship between the leader and the followers, and the level of intensity of the task at hand. Additionally, Zaltman and Duncan's *Strategies for Planned Change* (1977) emphasizes that resistance to change is one of the main factors that should be considered when leading organizational change; this phenomenon of members creating the context in which leaders work is also implicitly accounted for in Ely's (1990) conditions of change.

The combination of the literature support for the concepts presented in The Leadership Grid (Blake & McCanse, 1991) and the ability of researchers to flexibly use the grid to analyze specific instances of leadership behavior as contexts develop made

The Leadership Grid a valuable tool for this current project. The further detailing of behaviors within the literature that could be classified as either tasks- or people-focused by Yukl et al. (2002) provided this research project with specific behaviors to consider as the data was analyzed. This data and analysis was then further supported through the triangulation provided by a leadership instrument, the Life Styles Inventory (LSI), which was based on Blake and Moutons's 1962 work on managerial behaviors.

Life Styles Inventory (LSI)

The validity and trustworthiness of the leadership analysis portion of this study was enhanced by the collection of leadership inventory data (Life Styles Inventory; LSI) from participating science department chairs. This served as additional source of information about department chair leadership and their approaches to contextual situations. The LSI uses the Blake and Mouton's (1962) leadership axes as a conceptual base; this instrument, shown in Figure 2, analyzes the self-assessments of leaders to determine their level of focus on people and tasks, while also assessing the respondent's openness to growth versus their need for self-protection (Cooke & Rousseau, 1985; Lafferty, 1989). Ware, Leak and Perry (1985) confirmed the factor invariance and generality of this instrument in describing a person's focus on people and their own security, tasks and their own security and their own satisfaction needs.

Similar to the ability to use The Leadership Grid (Blake & McCanse, 1991) in different contexts, the authors of the LSI have found that people's scores on the LSI change based on professional development, changing work conditions, and traumatic experiences outside of work (LSI, 2011). Because of this ability to change leadership

styles based on contextual factors, the authors of the LSI recommend people retake this instrument frequently to monitor their possibly changing styles.

The LSI dissects a respondent's leadership focus into three overarching cluster, with each cluster containing four styles. The first cluster contains constructive leadership styles, including Humanistic-Encouraging, Affiliative, Self-Actualization, and Achievement styles. People who score high in this cluster of styles tend to focus on meeting their needs for growth and satisfaction by efficiently accomplishing tasks while working effectively with people (LSI, 2011).

The second cluster contains passive/defensive styles, including the Avoidance, Dependent, Conventional, and Approval styles. People who score high in this cluster try to find security and protection through their interactions with people, and less on the completion of tasks. Often, leaders in this category are responding to a harsh or unpredictable work environment in which they feel the need to protect themselves. Behavior resulting from this cluster tend to create situations in which subordinate lack direction; it creates an environment where innovative thinking and risk-taking are discouraged (LSI, 2011).

The third cluster contains aggressive/defensive styles, including Oppositional, Power, Competitive, and Perfectionistic styles. People who score high in this cluster try to find security and protection by focusing on task-related activities, and less on people or relationship-building. Often, leaders in this category feel their legitimacy is threatened; they then choose to respond to this feeling by controlling people and situations, and by

imposing their ideas on others. This behavior often alienates others and decreases others' interest in creativity, self-direction, and collaboration (LSI, 2011).

This study used department chair LSI scores to determine commonalities among participants, and to triangulate with leadership data obtained from department chair stories of change. LSI literature also provided possible explanations for discrepancies between the LSI scores and the leadership behaviors described by department chair stories of change, such as the influence extreme contextual conditions can provoke in leadership action.

The lenses provided by The Leadership Grid and the LSI allowed this current study to connect department chair leadership behaviors to the context of their organizations created by the change process. The goal of this study was to analyze how different leadership strategies and behaviors (as analyzed by The Leadership Grid, 1991 and further developed by Yukl et al., 2002) emerge recursively based on the environments created by stages of the change process (as identified by Havelock and Zlotolow's CREATER model, 1995) and by barriers to the change process (as identified by Ely, 1990). The combination of these frameworks provided a rich description of the experiences of department chairs as they led change within their departments.

Science Curriculum Reform

Educational reform can happen at the classroom, department, school, district, state or national level (Darling-Hammond, 2001). National policy-makers' interest in science curriculum appeared early in the history of education in the United States and has continued to result in waves of curricular changes within U.S. science classrooms.

Influences from some of these waves can be seen in the department chair stories within this study, and a few of these significant waves are described in this section.

In 1892, the National Education Agency assembled the “Committee of Ten,” which was given the charge to establish uniform college entrance requirements. Prior to this time, science was not part of the general education curriculum in the United State; however, influential intellectuals (such as John Dewey and Thomas Huxley) pushed for the inclusion of the study of science due to their perception that it would increase the ability of students to logically approach the world (DeBoer, 1991). The emphasis on laboratory experiences, along with the course and content requirements developed by this committee, triggered changes in high school curricula as school personnel worked to provide students with the educational background required to gain admission to college (Kliebard, 2002).

The committee’s science education recommendations included the suggestion that Biology, which at the time was primarily a descriptive science, should be one of the first courses taught in high school, with Chemistry, Physics, and other sciences taught later to allow students enough time to mature and obtain prerequisite math skills (Vasquez, 2006). Although the committee made this recommendation with some internal disagreement (i.e., the vote for the recommendation was not unanimous), the vast majority of high schools across the country adopted this basic sequence of science courses (Vasquez, 2006). Popularized questioning of this sequence began in the 1990’s; this questioning resulted in the Physics First movement, and two science departments examined in this study have chosen to break from the century-old arrangement of courses

to a sequence in which physics is placed at the freshman level (American Renaissance in Science Education, 2001).

A second major wave of science curriculum reform emerged in the 1950's and 1960's. In 1950, the National Science Foundation (NSF) was created to promote science research and science education in response to the perception that science was critical to our national security and prominence (Rutherford, 2005). Although Russia's launching of Sputnik in 1957 is usually credited for precipitating the re-examination of science education that occurred during this period – and it did in fact prompt political and public motivation for curricular change – calls for more rigorous coursework in United States schools had already begun in the late 1940's (Kleibard, 2002). Most of the pressure for change, as well as outlines of reformed science curriculum, came not from teachers, but from universities and governmental agencies that were motivated to fight anti-intellectualism by creating “teacher-ready” curricula (DeBoer, 1991). These curricula developed by the National Science Foundation include names that are still common today, such as the *Biological Sciences Curriculum Study (BSCS)*. The focus of these new science curricula was to train students to think like scientists (Yager, 2000), and was implemented with varying levels of success (McNeil, 2005).

This newly rigorous edge to science curricula blunted in the 1970's, partly prompted by concerns that scientific endeavors were harming the planet through nuclear power, pollution, overpopulation, and climate change (McNeil, 2005). Others science intellectuals were concerned by the low physics enrollment of high school students (Holton, 1999). These sentiments, along with the societal push to include more

minorities and females in the field of science, brought about new curricula that were intended to be more appealing and equitable. Arguments for a return of humanized science for everyday living, more reminiscent of science curricula prior to the launch of Sputnik, appeared in broad goals set by *Project Synthesis* (Yager, 2000) and *Project Physics* (Holton, 1999). These projects were initiatives that attempted to explicitly connect science to societal issues, as well as to students' personal needs, careers, and academic preparation (Yager, 2000).

By the 1980's, however, factors external to the United States once again stoked American unease in political, economic and social circles. Fueled by ostensibly superior educational and business management approaches, Japan and Germany were outperforming the United States in technological advances and economic growth (Yager, 2000). Public alarm over these trends were reinforced by the NSF's report to the president, *Science and Engineering Education for the 1980's and Beyond*, along with the more widely-known 1983 *A Nation at Risk* report, both which provided data indicating the United States educational system was falling behind those of other developed nations (National Commission on Excellence in Education, 2001; Rutherford, 2005). These reports called for strong standards that would raise the level of achievement of United States students, and from this, the first glimmers of the age of standards-based education appeared. Concerns raised by the *A Nation at Risk* report were further heightened by data from the *Trends in International Math and Science Study (TIMSS)*, which was first used in the United States in 1995 and has repeatedly shown students in the United States to be

performing below students from many other countries in science and mathematics learning (Mullins, 2009; National Commission on Excellence in Education, 2001).

As the perceived need for educational standards increased, along with the need for assessments to measure how well students were meeting these standards, multiple science organizations designed and disseminated science standards to schools and teachers, who in turn, adjusted their curriculum approaches (National Commission on Excellence in Education, 2001). One organization, the American Association for the Advancement of Science (AAAS), created an approach and a set of standards under the name *Project 2061* in the mid-1980's. *Project 2061* was named for the year Haley's comet would return and it set forth goals for science education that would hopefully be met by that time (Harty, 1993). Publications that resulted from this group include *Science for All Americans* and *Benchmarks for Science Literacy*, followed by multiple revisions and increased details in the present standards and approaches to science education.

The National Science Teachers Association (NSTA) also devised an approach and standards for science education called the *Scope, Sequence, and Coordination Project*, but it was not as popular as *Project 2061*. Under NSTA's urging, the National Research Council and the National Academy of Science's combined aspects of *Project 2061* and *Scope, Sequence, and Coordination Project* to create the *National Science Education Standards* (National Research Council [NRC], 2003). Standards in this publication, along with those presented by *Project 2061*, remained the central guidelines for science education and the creation of state-level science standards (NRC). Key ideas from these reform attempts include scientific literacy, relatability to student lives, increased rigor

and accountability, depth of content, and a focus on laboratory and investigative skills (NCR).

The standards provided by *Project 2061* and the *National Science Education Standards* led to an increased use of standards-based education in the 1990's (U.S. Department of Education, 2001), and fueled an increased interest in covering curriculum for depth of understanding. This movement, incentivized by federal government funding, encouraged states to create learning standards and assessments; these assessments are to be used to measure student achievement and school performance. This government-encouraged use of standards and standards-based assessments first manifested at the national level with Goals 2000, and was widely procreated in the current standards and testing approaches mandated under No Child Left Behind.

Currently, a trend moving away from independent state-created standards is underway as states join forces to design *Common Core* standards in English and Mathematics, with Science soon to follow with the *Next Generation Science Standards* (Achieve, 2008; Musick, 2010). As more states adopt these standards, a broader range of students across the United States will be exposed to common standards that are not constrained by state boundaries (Achieve, 2008). The influence of standards-based assessments are evident in work two department chair stories presented in this research that focused on implementing teacher-developed common tests with items correlated to common standards within their science courses.

The continuing influences of these science education reforms are evident in most public high school programs today: Biology is usually taught prior to Chemistry and

Physics, and college entrance requirements are rigorously followed by high schools; most curricula emphasize sciences connection to students' personal lives, society and the environment; the use of experimental approaches to science is considered a "best practice," as is standards-based education; and educators and politicians continue to use the threat of our students falling behind the global community to call for more rigorous science courses and accountability. Specific examples of science curricula reform spurred by these larger instances include an increased use of locally created common standards and assessments, an emphasis on the interaction between science, society and technology (STS), an incorporation of a vocational angle through Science, Technology, Engineering, and Math (STEM) programs, an emphasis on inquiry-based learning, a push to increase students' exposure to physics through a re-organization of science courses and science course sequences, and the integration of the sciences to more fully explore the nature of science (Clothey, 2010; McNeil, 2005; Vasquez, 2006; Yager, 2000).

Instances of science curricula reform efforts at the department level explored by this study reflect these larger trends that are influenced by national discussions; changes at the department level within this study were also found to have been prompted by local forces, such as changing demographics, teacher staffing issues, community interests, and school-wide reform efforts. In addition to investigating the immediate context created by the members of the department as a factor impacting the change processes led by department chairs, this study considered the source of the impetus for the change (national or local) as part of the context, and explored how this impacted department chairs responses as they usher in change.

Educational Reform Issues in the Literature

The success or failure of reform efforts rest not only on the substance of the reform itself, but also on the leadership that negotiates its implementation (Darling-Hammond, 2001; Furst & Cable, 2008; Kennedy, 2005; Rogers, 1995; Pearce & Sims, 2002; Yukl & Tracey, 1992). Additionally, for a reform effort to be successful, teachers must be willing participants in the change process, however, reform efforts often overlook this crucial factor (Darling-Hammond, 2001). Based on these findings, a large part of a leader's attention during a change effort should focus on the experiences and perceptions of the teachers who are expected to implement the reform (Darling-Hammond, 2001; Kennedy, 2005). Attention to teachers might include factors mentioned by Ely (1990) and Rogers (1995), such as teachers' opinions of the reform itself, their ability to participate in the change process, their levels of knowledge, their access to resources and time, their current stress levels, and their predisposition towards change. Given this background, this study explored how department chairs used leadership strategies and behaviors in anticipation of, and in response to, teachers' feelings and behaviors that act as factors or barriers that contribute to the context in which change is to occur.

A review of the literature on specific instances of reform suggests that teachers typically only modestly implement curriculum reform (e.g., Donnelly & Sadler, 2009; Penuel, Fishman, Gallagher, Korbak, & Lopez-Prado, 2009). Darling-Hammond (2001) observed that one reason reform efforts fail is that although teachers who were involved early in the change process understood the reform and influenced how the reform

developed, late adopters viewed the reform as a mandate, which left little room for them to feel ownership or develop a deep understanding of the reform effort. Both Ely (1990) and Rogers (1995) address the importance of leaders involving members in the decision to embark on the change process; this involvement alters how participants view the origins of the innovation and the change process. The real or perceived impetus of reform can be categorized in common language as coming from the ground-up (teacher-initiated), from the top-down (administration-initiated), or from the outside-in (initiated by a source outside of the school, such as a government agency). These various reform origins each precipitate unique benefits, but also unique drawbacks. A benefit of top-down or outside-in efforts is that prior to the reform taking place, reform leaders can use their time to conduct research on the reform they are proposing and to strategically plan professional development, support, and implementation. However, as Berman and McLaughlin observed in the 1970's, these initiatives also are coupled with the risk that teachers may not feel invested in the process or the product, and therefore may undermine or resist the reform (as described in Borman, 1998). Ground-up initiatives entail the reverse: Whereas teachers feel invested, they may not have the time or knowledge to properly plan or develop support systems their reform efforts (Borman, 1998). The potential combined benefits of these two approaches to reform and their drawbacks led Darling-Hammond (2001) to state that bottom-up change requires top-down support. This study supports these findings: The origins of the change efforts, along with ability of teachers to participate in the change adoption decisions were

contextual factors that impacted science department chair leadership behaviors and the success of the change attempts they led.

In addition to the source of the reform initiative and the level of teacher involvement in the decision-making processes, Kennedy (2005) proposed five teacher-centered reasons educational reform efforts fail, most of which mirror aspects of Ely's conditions of change (1990) and can be addressed during various stages of Havelock and Zlotolow's (1995) CREATER model. Kennedy's five factors, coupled with supporting evidence from the literature, are:

- *Teachers need more knowledge or guidance to alter their practices.* A review of the literature in which local reform efforts were attempted reveals that professional development provided solely at the outset of the reform efforts does not mitigate teachers' inability to sustain their energy and motivation for the reform effort (e.g., Penuel, Fishman, Gallagher, Korbak, & Lopez-Prado, 2009); additional studies found that teachers with strong content knowledge felt more comfortable with reform efforts (e.g., Kelly & Staver, 2005; Metz, 2009). This factor of teachers needing more knowledge or guidance during reform efforts mirrors one of Ely's (1990) conditions which states that change participants need to possess sufficient knowledge and skills to participate in the change process, and that they need sufficient time to develop and institute the change. Addressing teacher knowledge and professional development would best occur during the Care, Relate and Examine stages of the CREATER model; during these stages, the leader determines the needs of the

system, supports the participants, and devises a plan of change implementation. This factor should also be revisited in the Extend stage in which ongoing professional development based on feedback is provided (Havelock & Zlotolow, 1995).

- *Teachers hold beliefs and values that differ from the reformers and justify their current practices.* Literature findings demonstrate that teachers became most comfortable with reform curriculum when they modify reform curriculum to meet their particular students' needs and to fit their own personal science education philosophies and interests (e.g., Kelly & Staver, 2005; Metz, 2009). This relates to Ely's condition of dissatisfaction with the status quo, participants' knowledge and skills, and participation of teachers in change implementation decisions (1990). The level of dissatisfaction with current practices can result in various approaches to remedies, and a lack of knowledge (or perhaps a greater degree of knowledge) compared to the change agent may impact how the reform effort is implemented. Additionally, teacher participation in decision-making could alert change agents to adjustments that could be made to the innovation to better meet teacher needs and interests. These conditions would be most apparent to the change agent during the Try, Extend, and Renew stages of the CREATER model. These last three stages of the CREATER model are when participants have the innovation more under their own control; what participants do with the innovation and the resulting outcomes may or may not match the change

agent's desires, and teacher feedback can be analyzed by change agent to determine next steps.

- *Teachers have dispositions that interfere with their ability to implement reform.* Researchers have shown that teachers, in general, are resistant to change (Kennedy, 2005). Resistance to change within organizations is such a common occurrence, that Zaltman and Duncan's *Strategies for Planned Change* (1977) focuses solely on this phenomenon. While this resistance-focused model will not be a primary analytical tool for this study, resistance can be influenced and addressed through a consideration of Ely's (1990) conditions of dissatisfaction with the status quo, participants' level of knowledge and skills, the availability of resources and time, the participation of teachers in decision-making during the change process, and the use of rewards and incentives. Consideration of resistance and how to counter this barrier to change should occur during the Care, Relate and Examine stages of the CREATER model. These stages include the change agent's exploration of the context and the needs of the potential adopters, communication with participants on the change and their concerns, and strategic planning of the change process that can result in an increase of participants' investment in and comfort with the change.

• *The circumstances of teaching prevent teachers from altering their practices.* Reform leaders must consider the context in which reform actions occur. Teaching is a difficult and multifaceted job, and as new reform efforts are

overlapped on previous reform efforts, teachers can become exhausted (Darling-Hammond, 2001; Kennedy, 2005). This factor is addressed by Ely's (1990) condition of availability of time and resources, and Rogers' (1995) factors of the consideration of the context in which change is to occur.

Determining if the change is possible based on the structure of the organization and the job requirements of the participants should occur in the Care stage of the CREATER model, in which an initial evaluation of the situation is completed by the change agent. If a change implementation seems feasible to the change agent during the Care stage, revisions to this initial determination may occur during the Relate and Examine stages in which initial feedback from potential adopters is received. If the indications are that the situation can handle the addition of a change implementation during that stage, another check point will occur during the Extend and Renew stages in which the change implementation is evaluated.

- *The reform ideals themselves are unreasonable or actually impede practice.*

In their analysis of a failed reform effort, Tyack and Cuban (1995) determined that teachers went back to their pre-reform ways due to being exhausted from the reform effort itself. This aligns with Ely's (1990) condition of availability of time and resources, as well as Rogers' (1995) factor of the perception of nature of the innovation. If the innovation itself does not fit within the existing structure of the organization, or it is too ambitious, teachers will not have the time, energy, or ability to enact it. Protecting against exhaustion

should be part of the planning process described in the Examine stage of the CREATER model, and again during the Extend stage when feedback is gathered by the change agent and additional support can be provided based on that feedback. Finally, the change agent must be realistic as to what the reform affect will be on participants and their work.

Educational change literature commonly mirrors general change literature; however, it gives special attention to the role that teachers play in implementing educational change. Reform efforts may be compromised or precluded if teachers do not believe in the educational reform effort (which relates to Ely's (1990) condition of dissatisfaction with the status quo), or if they do not possess the skills or have the time or energy to carry out the reform actions (reflected in Ely's conditions of participants' knowledge and skills and the availability of time and resources) (Darling-Hammond, 2001; Kelly & Staver, 2005; Kennedy, 2005; Metz, 2009; Penuel et al., 2009). Educational leaders must understand their roles as leaders and the change process, but they also need to understand that teachers are a fundamental aspect of educational reform. This study's analysis of department chair stories of the change process used Havelock and Zlotolow's (1995) and Ely's (1990) change process frameworks coupled with The Leadership Grid (Blake & McCanse, 1991) determined that participating department chairs did anticipate, understand, and respond to teachers as strong contributors to the context of change.

Conclusion

Instituting science education reform requires leadership (Darling-Hammond, 2001); in this study, science department chairs were the focal point for the exploration of how leadership influences the change process that eventually leads to educational reform. As educational leaders attempt change, they should consider the context in which the change is to occur, such as the conditions presented by Ely (1990). They also should consider the progressive stages of the change process such as those presented by Havelock and Zlotolow (1995), as well as the powerful role teachers' play in educational reform (Darling-Hammond, 2001).

This study explored successful and unsuccessful changes stories shared by six secondary school science department chairs. The department chairs in this study attempted to implement various curricular changes within their departments to enhance the educational experiences of their students in response to demographic changes and current educational trends. Through their interviews and documents, alignments were identified between their change stories and two change process frameworks: Ely's (1990) conditions of change and Havelock and Zlotolow's (1995) CREATER change stages model. Department chair leadership strategies and behaviors were identified through the use of Blake and McCauley's (1991) Leadership Grid and Yukl et al.'s (2002) leadership behavior categories; these leadership strategies and behaviors were then connected to these change conditions and stages to determine if recurrent themes emerged.

Only a few authors have linked the change process to specific leadership behaviors (e.g., Kotter, 1995), and none have linked change process frameworks to

leadership models (Herold et al., 2008). The results of this study connecting the specific constructs of leadership and change help to fill this gap in the literature and provides additional information that further elucidates details of the co-dependent relationship between the change process and leadership. Findings from this investigation expand our understanding of how change literature and leadership strategies can be used to enhance reform efforts and improve our schools and curricula.

CHAPTER III

METHODOLOGY

Secondary school department chairs are often the content area instructional leaders in their schools and are responsible for providing students with the most current and appropriate curricula and programs (Fenney, 2009; Hannay & Erb, 1999; Lucas, 2000; Sergiovanni, 1984; Tucker, 1993; Wettersten, 1994; Zepeda, 2008). However, department chairs have limited authority and often must negotiate tensions between their faculty and administrators in order to institute organizational change (Gmelch, 1993). If the responsibility to provide students with the best curricula and programs falls to agents with limited power, how do they lead curriculum or program changes? This question launched an exploration of the intricacies of the change process as experienced by science department chairs. Specifically, this study explored how department chairs used leadership strategies and behaviors in response to, or in anticipation of, change process barriers and throughout various stages of the change process.

Leadership and the change process, two abstract and interdependent constructs, hold central roles in this study. In contrast to managers who focus on the smooth operation of their institutions, leaders are expected to constructively change institutions (Northouse, 2004). Examining leadership actions within the context of change, therefore, could shed light on both school-reform processes and the implementation of change in schools. Change is an integral part of leadership, and the relationship between leadership

and change is evident in various change process research and models in which change is instituted by a leader or “change agent” (e.g., Ely, 1990; Havelock & Zlotolow, 1995; Rogers, 1995).

The change process literature most salient to this project include frameworks developed by Ely (1990) and by Havelock and Zlotolow (1995). Ely’s (1990) conditions for change delineated the conditions that enhance the probability of change implementation success, including: (i) Dissatisfaction with the status quo, (ii) Sufficient knowledge and skills, (iii) Availability of resources, (iv) Availability of time, (v) Rewards or incentives, (vi) Participation, (vii) Commitment, and (viii) Leadership. In their book, *The Change Agent’s Guide*, Havelock and Zlotolow (1995) proposed a model described a different aspect of the change process: Change process stages. *The Change Agent’s Guide* built on the foundation of Lewin’s (1947) unfreeze-move-refreeze” model to identify specific stages of the change processes. These stages, denoted by the acronym CREATER, include: “Care,” “Relate,” “Examine,” “Acquire,” “Try,” “Extend,” and “Renew.” This study used both of these perspectives on the change process as complementary lenses to analyze the experiences of secondary school science department chairs as they led change within their departments.

In addition to these frameworks on the change process, this study viewed the concept of leadership through the lens of Blake and McCauley’s (1991) Leadership Grid, which was adapted from key constructs in Blake and Mouton’s (1962) managerial theory. The Leadership Grid is a standard in leadership studies, and has been used directly or indirectly as the foundation of several modified assessment instruments, such as the Life

Styles Inventory (LSI; Cooke & Rousseau, 1985; Lafferty, 1989). As shown in Figure 1, The Leadership Grid analyzes leadership along two axes: Concern for people and concern for tasks. Five styles of leadership may be mapped on this grid, including the styles Blake and Mouton labeled “country club,” “team management,” “middle-of-the-road,” “impoverished,” and “authority-compliance.” The LSI, shown in Figure 2, further expanded these axes to include mapping of participants’ focus on satisfaction and security needs.

Characteristics of leadership and the change process interact differently depending on the contexts in which they function; Yin (2003) suggested that this type of intimate tie with context should encourage researchers to apply a qualitative lens to their investigations. From this point of view, quantitative measures would provide possibly misleadingly and constrained views of the multilayered, multi-factored, nuanced, and continuous stream of recursive interactions that emerge between leadership and the context created by the change process. Each story of leadership and change contains multiple factors that interact in a complex manner that stretch the limits of numeric descriptors. Although it would be valid to quantitatively identify the stages and behaviors leaders make during the change process, relying solely on quantitative measures would miss important contributory factors that illuminate “how” and “why” decisions are made in response to, or in anticipation of, the situations created by the change process (cf. Schramm, 1971, as described in Yin, 2003).

The overarching goal of this study was to explore and describe the process by which secondary school science department chairs lead changes within their department.

This study met this goal by identifying how and why department chairs adjust their leadership strategies and behaviors in response to, or in anticipation of, contextual barriers to change and change process stages.

Research Questions

This project explored department chair leadership strategies and behaviors that emerge in response to, or in anticipation of, both (i) contextual barriers to change and (ii) change process stages. The study was able to link leadership styles to stages and barriers present in the change process by examining data collected via document analysis, interviews, and a leadership style inventory. A clearer understanding of the role department chairs play in curricular or program reform emerged from the analysis of this data, as did a deeper understanding of how contexts created by the change process can influence, and reciprocally be influenced by, chairs' leadership behaviors. Rich description of chairs' experiences leading change also provided fuller insight into how leaders navigate the change process and overcome change process barriers.

Based on the goals of this study, the research questions investigated were:

1. How do department chairs describe their experiences with barriers to change?
2. In what ways do department chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
3. Why do chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
4. How do department chairs describe their experiences and roles as leaders during stages of the change process?

5. In what ways do department chairs alter their behaviors and strategies during stages of the change process?
6. Why do department chairs alter their leadership behavior and strategies during stages of the change process?

Methodological Overview: Multiple Case Study

This multiple case study was designed to explore and describe the relationship between leadership and the change process. A multiple case study approach was chosen for this study based on (a) the contextual influence on the constructs at the heart of the investigation, and (b) the study's focus on understanding "how" and "why" emergent properties materialize within the interactions between leadership and the change process. As Yin (2003) stated, case studies should be applied when "contextual conditions... might be highly pertinent to your phenomenon of study" and when "the boundaries between phenomenon and context are not clearly evident" (p. 13). This study investigated the context that was co-created by the phenomena at the center of the study, leadership and the change process, each of which reciprocally influences manifestations of the other.

The unit of analysis for this study is the change process, bounded by leadership of a science department chair within a secondary school, and retrospectively beginning at the inception of the change and ending at the time of this investigation. The unit of analysis was accessed through the reports, artifactual submissions of department chairs, and a leadership inventory (LSI). Participants of this study were tenured at their schools to increase their comfort in sharing their stories of successful and unsuccessful change,

and participating chairs were the primary leaders who oversaw, or who were overseeing, a curricular or program changes within their departments.

To pursue this investigation, this study explored stories of change as told by six science department chairs: Two department chairs recounted stories of successful change, and four department chairs shared stories of both successful and unsuccessful change. These department chairs were selected purposefully and differentially based on their ability to contribute to the goals of this study. The case selection process for these six department chairs is described in detail in the Data Collection section of this report.

Participating science department chairs were selected for this study based on their anticipated ability to contribute to replication logic and theory-building (Yin, 2003). Department chair stories of change were viewed, as Yin proposed, “like multiple experiments,” which provided the ability to analytically arrive at generalizations upon which a fuller understanding of the interplay between change and leadership can form (p. 32). Yin also discussed the strengthening of qualitative research when it is able to outline “conditions under which a particular phenomenon is likely to be found (literal replication), as well as the conditions when it is not likely to be found (theoretical replication)” (p. 47). This literal and theoretical replication is evident in this study, and points to commonalities between cases of successful instances of change and differences between successful and unsuccessful instances of change. In addition, literal replication emerged among both successful and unsuccessful instances of change, indicating a common thread in department chairs’ leadership approaches to the change process.

Data Collection Methods

Leadership and change are co-dependent, non-linear, and heterogeneous phenomena; investigators therefore can best explore these complex constructs through open and semi-structured research protocols that allow space for a wide analytical lens. This study chose to use a flexible approach that allowed participants to highlight investigative trajectories that were not expected prior to the study's initiation. This *in-situ* flexibility ensured that participants were able to tell their stories robustly while the researcher gently maintained their focus on the research questions (Yin, 2003). Although this study was designed to be open and flexible, it was guided by previous leadership and change process theories that provided frameworks through which the phenomena presented by cases in this study were viewed. These frameworks, along with the purposeful goals of this study, provided a concise, yet flexible focus that guided the collection and analysis of data.

Upon receiving IRB approval, data-collection methods sequentially included (i) document collection, (ii) an initial interview with the chair, (iii) the completion of the leadership instrument (LSI), (iv) a second, follow-up interview with the chair for member-checking, follow up questions, and a review of LSI results, and (v) a final interview to share the results of the study and to receive feedback from participants on the study's findings. Most of these data-collection methods took place "in the field," which allowed casual, field observations of the department chair and department environs.

This data collection approach accessed multiple sources of information using multiple methods, a strategy that increased the validity of this study's findings through methodological and data-triangulation (e.g., Denzin, 2003; Yin, 2003). As Yin argued, "multiple sources of evidence essentially provide multiple measures of the same phenomenon" (p. 99). Consistent with this strategy, data gathered from this study's document analysis was used to "corroborate and augment evidence" (Yin, p. 87) garnered from interviews. Similarly, interpretations of the department chairs' leadership strategies and behaviors using The Leadership Grid (Blake & McCanse, 1991) were triangulated with the results obtained from the professionally interpreted LSI. Finally, interviews with the department chairs were member-checked and time was allotted for participants to provide their own interpretations to the findings. This triangulation between these multiple sources and methods buttresses a single, cohesive interpretation of the leadership and change process within and between each case.

Selection of Cases

An attempt was made to select cases for this study that were, as Eisenhardt and Graebner (2007) suggested, "particularly suitable for illuminating and extending relationships and logic among constructs" (p. 27). Cases for this purposeful selection were identified from the membership of the Illinois Science Educator Leaders Association (ISELA). A brief email was sent to members of this organization, providing recipients with a general overview of the goals of this study and inviting them to participate in an online survey about leading change within science departments.

The first set of survey questions were designed to identify science department chairs who had attempted change within their departments, were tenured at their current school, had held their current position for over two years, had over five years of experience in the field of education, and were interested in participating more fully in this investigation into how leaders enact change in science departments. A second set of questions were designed to identify stories of change that involved more than five teachers, related to curriculum reform, and were either seen as mostly successful or mostly unsuccessful by the participant. Results from this survey were analyzed on a rubric (see Table 1) to identify potential participants.

Table 1

Example of the Selection Rubric

Case #. Change #	1.2	1.3
Position	DC	Principal
Tenure status/No longer relevant due to change in districts	Tenured	No longer at the school discussed
Yrs at school of change	5	7
Yrs in position of change	5	3
Yrs in education	9	18
% of change goals met	75%	25%
% of change complete	90%	25%
# of teachers involved	6	19
# of teachers buying in	5	6
Origin of the change	DC suggestion	DC mandate
Recommend the change?	Yes, conditionally	Yes
Contact information	555-555-1111 Sally May	555-555-2222 Joe Smith
Other notes	Interesting due to connection to STEM	

Of the 68 survey respondents, 57 reported that they had attempted to lead change within their departments. Respondents who had attempted change reported either solely successful experiences, or both successful and unsuccessful experiences, with leading change. A tally of the survey responses of the different types of successful and unsuccessful changes can be seen in Figure 4. From this tally, no clear trend can be seen in topics that differentiated the successful from the unsuccessful instances of change; however, these responses indicated current trends in science education at the department-level revolve around the types of courses offered to students and how those courses are conceptualized, created, analyzed, and evaluated for their impact on student learning.

Of the 68 individuals who responded to the survey invitation, 31 held department chair positions, of which 11 stated that they would be interested in participating further with this research project. Of these 11 respondents, eight met this study's criteria, and six of these eight chose to participate in this study.

Participating Cases

Of the six department chairs who participated in this project, two reported only successful experiences with leading change, and four reported both successful and unsuccessful experiences with leading change within their departments. Three participants were female, and three were male. Three had worked in education 15 or more years, three had worked in education between 6-15 years; one had been in his current department chair position for 15 or more years, whereas the other five had been in their current department chair positions for 6-15 years. All participants were located within two hours of a single major Midwestern United States metropolitan area.

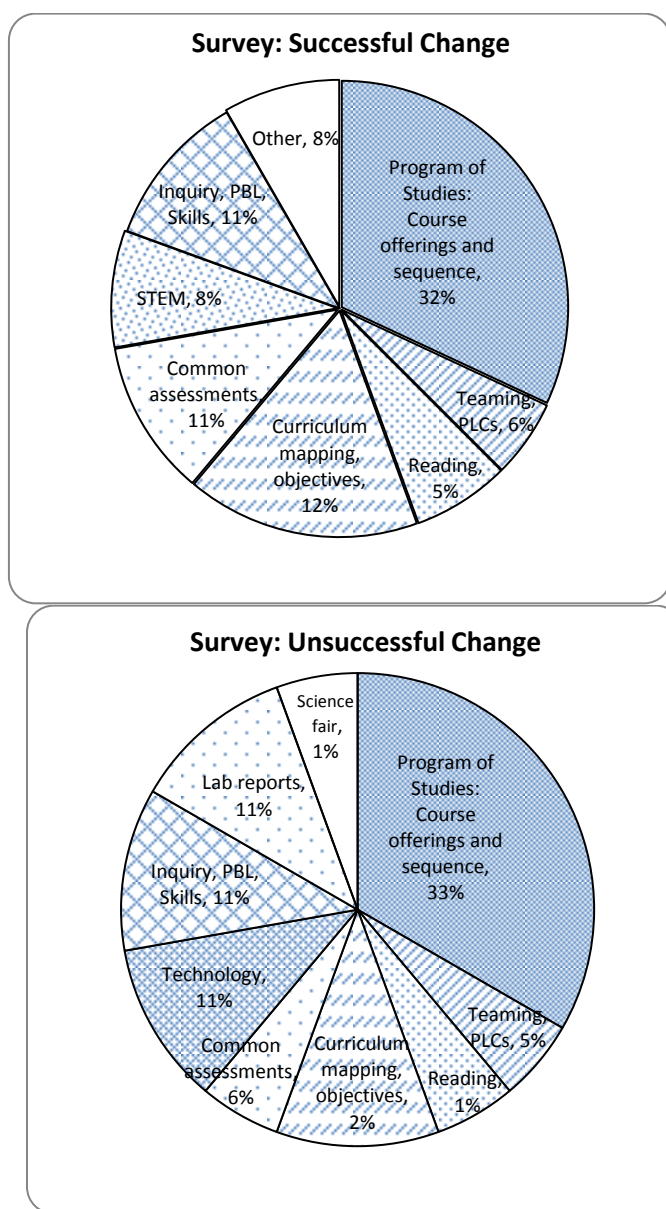


Figure 4. Survey Responses: Types of Successful and Unsuccessful Instances of Change

Prior to this project, I had previously established positive, yet limited relationships with three of these participating department chairs through my work with state- and regional-level professional organizations. In addition, two other participating department chairs knew who I was through my work in these science education

organizations, although I was not familiar with them. In the remaining case, neither of us had known directly or indirectly of one another prior to this project. Due to my work with state- and regional-level organizations, I was not surprised by this level of familiarity with department chairs who responded to the online survey; however, with one exception, department chairs with whom I interacted with more than twice per year were excluded from this study to mitigate familiarity that could impact my interpretations of their stories of change within their departments.

Because several of the department chairs in this study are known professionally, both nationally and in the region in which they work, some possibly identifying aspects of their stories less germane to the thrust of the investigative lines of this study will not be detailed to protect confidentiality of department chairs and teachers. Department chair stories have been briefly described in Table 2, and other aspects of their stories will be shared as comparable units within the analytical framework of this research.

Description of DC1's successful change context. DC1's school is transitioning from a rural school to an outer-ring suburban school. This transition has been accompanied by rapid growth in student population, which required the building of a new freshman campus to house the additional students. This external factor prompted DC1's change initiative explored in this study. Currently, her school's population is approximately 2,400 with little minority representation, but both of these characteristics are in flux. DC1 has been in education for over 15 years, and transitioned from a full-time teacher at her school to department chair between 6-15 years ago. She continues to teach a reduced number of classes as she completes her department chair duties.

Table 2

Descriptions of Department Chair Stories of Successful and Unsuccessful Change

Department Chair (DC)	Successful Change	Unsuccessful Change	School Description	Demographics
DC1	Common grading followed by common assessments	None discussed	Rural transitioning to suburban Student population 2000+ in multiple high schools	5% Black 11% Hispanic 83% White 9% Low income
DC2	Course sequence change	Course sequence change	Suburban Student population 3000+ in multiple high schools	8% Asian 1% Black 2% Hispanic 85% White 3% Low income
DC4	Common assessments	None discussed	Suburban Student population 5500+ in multiple high schools	30% Black 24% Hispanic 42% White 48% Low income
DC5	Course revisions	Curriculum mapping	Suburban Student population 2000+	5% Asian 1% Black 5% Hispanic 87% White 7% Low income
DC7	Changing the freshmen course	Lab report format	Suburban Student population 1500+	2% Asian 1% Black 3% Hispanic 93% White 1% Low income
DC8	Integration of Inquiry into Physics and ES courses	Revising a course approach	Suburban Student population 1500+	3% Asian 1% Black 3% Hispanic 92% White 1% Low income

This study investigated DC1's leadership during her successful change during which she oversaw the implementation of a common grading system and common assessments between content courses. When DC1 learned that a new campus was going

to be opened for freshmen to accommodate their growing student population, she realized that maintaining consistency between classes of the two campuses would require a higher level of coordination between teachers to ensure that all students had similar experiences. An additional factor that prompted this move was the increased access parents have to online information about student grades and courses, which adds to the need for the department chair to be able to defend the content and activities of all courses on both campuses.

Description of DC2's successful and unsuccessful change context. DC2's school is a wealthy, high-performing suburban high school with a current population of 3,100 containing little minority representation. This school experienced overcrowding due to student population growth in the mid-1990's, which required the opening of a new freshman campus. This external factor prompted DC2 and his teachers to consider this challenging development as an opportunity to create two new course sequence strands; one of these course strand initiatives explored in this study was successful, and one was not. DC2 has been in the field of education for over 15 years, and transitioned from a full-time teacher at his school to department chair over 15 years ago. Other teachers, who are still in the department, had also applied for the position.

The changes this study investigated involved creating two sequential strands of courses to replace courses that students could choose randomly. The first change created a Physics-Chemistry-Biology sequence that had received attention in science education literature and had been suggested by a parent. After this idea was investigated by the department over a number of years, the change was implemented successfully. A similar

change to create a Biology/Earth Science sequence was explored by the department, initially decided upon and planned for, then abandoned by teachers prior to the details of the change being determined.

Description of DC4's successful change context. DC4 is the science and music department chair for three high schools within one suburban high school district; these three high schools have a combined population of 5,825 students with a fairly even representation of ethnicities. This study explored this department chair's successful change initiative that created common assessments across similar courses in all three of her high schools. This change was mainly prompted by best-practices as explored in recent educational literature. DC4 has been in the field of education for over 15 years, and transitioned from a full-time teacher at her school to department chair between 6-15 years ago.

Description of DC5's successful unsuccessful change context. DC5's school is a suburban high school with a current population of 2,240 containing little minority representation. DC5 has been in education between 6-15 years and has served as a department chair between 6-15 years. The department chair in this case was previously a teacher in another school district prior to being hired to be the department chair at his current school. His hiring was necessitated by the previous department chair having stepped down to become a full time teacher within the department. In addition to his department chair duties, he teaches a reduced number of classes.

Upon being hired, the administration informed DC5 of two changes that they needed him to oversee within his first year. One of these changes was successful, while

the other was not. The successful change revolved around replacing a popular freshman course and altering others, and the unsuccessful change involved curriculum mapping.

Description of DC7's successful and unsuccessful change context. DC7's school is a fairly wealthy suburban high school with a current population of 1,730 containing little minority representation. This department chair has been in education for over 15 years and she has served as a department chair between 6-15 years. Similar to DC5's situation, DC7 was hired from another institution, and this hiring was prompted by the previous department chair stepping down from the position. In addition to being the department chair, she also teaches a reduced number of classes.

Upon DC7's hiring, her teachers approached her with an idea for a change: They wanted to offer a physics-based course for freshman students. This department chair supported her teachers and helped them institute this successful change. Later in her tenure, she attempted to implement a common laboratory report format across courses, but teachers did not like this idea, and it eventually was abandoned.

Description of DC8's successful and unsuccessful change context. DC8 works at a suburban high school with a current population of 1,700 that has little minority representation. DC7 was a teacher for a few years at his school before he became the department chair; his hiring was prompted due to the previous department chair stepping down to become a full-time teacher. Multiple teachers applied for this open position, and many of these teachers are still working within the department. DC8 has been in

education for 6-15 years and has served as a department chair between 6-15 years. In addition to serving as the department chair, he also teaches a reduced course load.

This study explored DC8's successful change in which his Earth science and physics teachers increased the amount of inquiry lessons their curriculum, as well as his unsuccessful change in which the same goal was attempted with his Biology team. Both of these change attempts were prompted by best-practices as examined and discussed in professional literature and conferences. The high numbers of D's and F's in Biology were an additional motivator to add an inquiry angle to increase student engagement with the content.

Document Analysis

Prior to interviewing department chairs and after receiving verbal consent, I requested examples of documents department chairs believed to have been important to the change process. These documents included PowerPoint presentations, meeting agendas and notes, change plans, teacher feedback response sheets, and other notes related to the change process. An initial, broad analysis of these documents provided insight into the barriers encountered or anticipated by department chairs, as well as instances of leadership attention to tasks and people. Stages of the change process were also evident in these documents. Information gained from these documents was used to augment initial interview prompts, resulting in site-specific interview questions, as well as to triangulate data gathered from interviews and the LSI.

Although the document analysis portion of this study provided only a limited amount of information, it served as a source for triangulation and spurred enhanced

interview interactions with department chairs. Unlike spoken words, documents are tangible, concrete, and permanent; therefore, more effort is expected to go into their construction and editing compared to a casual conversation (Creswell, 2009). This revealing aspect, therefore, provided insights into the unstated leadership strategies of the department chair. Additionally, documents have the ability to communicate concepts beyond their actual words; they are a means to achieve an objective which may or may not be stated (Yin, 2003). Although the words within the document were the most important source of triangulating, the document formats also served as indicators of the image the department chair wished others to perceive of both her or his leadership and the change process itself.

Initial Department Chair Interviews

Interviews can be highly structured or fall into natural rhythms of conversations, with one person expressing an interest in the other person's experiences (Denzin & Lincoln, 2003). Although research questions are often written for guidance, the interview structure can allow for fluidity within the line of investigation. An effective qualitative interview must have enough give-and-take to encourage the interviewee to continue the conversation, yet provide structure to guide the conversation (Yin, 2003). The nature of a semi-structured interview allows the researcher not only to collect data, but also to conduct on-the-spot analysis of collected data and to adjust the line of questioning to probe into topics not anticipated prior to the conversation. Interviews within this study were based on conceptualizations such as these, and provided multiple insights into the experiences of department chairs as they led change within their departments.

After reviewing and signing the consent form, the initial, 90-minute, semi-structured, open-ended interview with each department chair was audio-taped to allow concentration on conversational interactions and casual field observations of the physical environment and the department chair. Although interviews were guided by both generic inquiries and specific questions based on the provided documents, space was provided for chairs to take their responses in directions they saw as meaningful. Limited notes were also taken during the interview to help guide questions and to record my perceptions of the chair's leadership style as seen through their mannerisms. The audio recording of this interview will be kept in a secured cabinet in my office along with notes from the interview and will be destroyed within three years of the interview.

The purpose of this first department chair interview was to gather data on the chair's perceptions of 1) the progression of the change process, 2) his/her role in the change process, 3) his/her responses to different stages of the change process, 4) his/her responses to obstacles that occurred during the change process, 5) the success of the change process, and 6) his/her leadership strategies and behaviors. Other data gathered during this interview came not only from the content of the chair's words, but from the style in which the words were delivered, the chair's body language, and the words used in responses. This data was then analyzed through the lenses of Ely's (1990) conditions for change, Havelock and Zlotolow's (1995) CREATER model, and The Leadership Grid (Blake & McCanse, 1991) with behaviors identified by Yukl et al. (2002) as outlined in the data analysis section.

Table 3 displays the semi-structured interview questions that were used to promote the semi-directed responses from department chairs, with each question aligned to models or literature findings predicted to be the most appropriate for analysis. Based on the pilot study for this proposed research, department chairs were anticipated to spontaneously answer many of these interview questions without prompts as they naturally discuss their experiences.

Table 3

Interview Guiding Questions and Corresponding Change and Leadership Frameworks

Interview Q	Framework
Can you give me a summary of the curricular/program change?	General, context
Where did the idea for this change come from?	Ely, CREATER
What were the beginning steps of getting this change underway?	Ely, CREATER
How did you approach your faculty with this idea?	The Leadership Grid, Ely, CREATER
How did your faculty respond? How did you work with that?	Ely, The Leadership Grid
Did you encounter any (other) obstacles during this time?	Ely
If so, how did you handle them?	The Leadership Grid
Was your administration involved during this time?	Context
How would you describe your role during this beginning stage of the process?	The Leadership Grid, CREATER
What were your next steps?	The Leadership Grid, CREATER

Table 3 (continued)

Did you encounter any obstacles during this time?	Ely
If so, how did you handle them?	The Leadership Grid
How would you describe your role during this stage of the change process?	The Leadership Grid
How would you describe your leadership style?	The Leadership Grid,
In what ways has your leadership style helped or hurt this process?	The Leadership Grid, CREATER
Is there anything that you look back on and would do differently?	The Leadership Grid, Ely, CREATER
Were there resources you accessed to help you negotiate this change process?	Context
What would you say was the biggest obstacle? How did you handle that?	The Leadership Grid, Ely
What do you wish you would have known prior to attempting this change?	The Leadership Grid, Ely, CREATER

Leadership Inventory

The Life Styles Inventory (LSI) leadership instrument and The Leadership Grid are both based on Blake and Mouton's management theory (1962); these two tools analyze leadership as being either task- or people-focused (Blake & McCanse, 1991; Lafferty, 1989). The LSI also identifies leadership styles as being influenced by a need for security and self-protection, or by a need for satisfaction and growth. The LSI results provided a source for methodological triangulation to which I compared my own interpretations of the department chair's leadership strategies and behaviors. Department chairs completed the LSI after the initial interview, then mailed it to Human Synergistic for professional scoring. The LSI results were analyzed and reviewed with each chair

during the second interview. Information gathered from this instrument will be kept in a locked cabinet in my office for three years, then destroyed. A benefit for department chair participants in this phase of the study was the LSI results, accompanying Human Synergistics analysis, and suggestions generated by Human Synergistics for professional development.

Second Department Chair Interview

The second department chair interview was a focused interview designed to explore the reflections of the department chair on their experience of the change processes and their perceptions of their leadership strategies and behaviors. This interview was anticipated to take one hour to complete due to the reflective nature of this session on “why” questions. Clarifying questions were asked that included references to themes that emerged from the analysis of the first interview and LSI. This second interview also provided an opportunity for the chair to add or amend their story provided in the first interview. Examples of clarifying questions included:

- Were there any follow-up discussions with teachers? How did you approach these? What went into your thinking?
- Once the change was decided upon, how did teachers work together to develop their ideas? What role did you play?
- How are other teachers responding to this change?
- Have there been any celebrations?
- Why do you feel this worked so well/poorly?
- How did this make you feel? What were you thinking at this time?

- How well do you feel the LSI matches your perceptions of your leadership?
- If you had to approach this change again, what would you do the same? What would you do differently?
- Is there anything in my description of your story that needs to be adjusted? Is there anything you'd like to add?

Final Department Chair Interview

The final department chair interview consisted of sharing a condensed version of the results of this study, along with providing department chairs a thank you gift card for their participation in the study. This audio-recorded interview was designed for member-checking and to enlist other analytical minds to view the data to determine if my interpretations of this study seem valid. Department chairs provided their own observations and insights based on this data, which has been incorporated into the discussion of this report. Examples of questions during this interview included:

- Is there anything in my description of your story that needs to be adjusted? Is there anything you'd like to add?
- As I share this information with all of department chair stories combined, feel free to interrupt and share your thoughts as we go.
- Here are some thoughts I have on trends that I think are in these stories. Does this seem accurate? Am I missing anything?

The third and final interview with department chairs served three functions: (i) member-checking of change attempt stories, (ii) collection of additional reflections on

leadership and the change process, and (iii) elicitation of department chairs' thoughts about the compiled data and my interpretations of the results of this study. This third function increases the trustworthiness of the findings of this study, and it provided additional analysis from individuals who are intimately involved with leadership and change. I considered the department chairs' backgrounds as I created the presentation for our final interview sessions, hoping to enhance their interest in participating in this analysis of the data.

The scientific backgrounds of the department chairs in this study equipped them with a familiarity with quantitative data and approaches to research, but their training in education had opened their minds to the need for and the benefits of qualitative research. Based on the characteristics of my primary audience, I chose to present my qualitative data in a manner that would tap into their predilection for graphs and visual illustrations, and yet provide qualitative richness through stories, descriptions, and quotes to enliven the findings with holistic and human elements.

Presenting data through multiple methods, as I have chosen to do with the data from this study, has been championed by Miles and Huberman (1984). In their view, visual displays are able to represent information that previously would have been presented as cumbersome narration. These visual displays allow readers to quickly ascertain and understand information. Miles and Huberman state that the use of graphs and other visual illustrations help not only with data presentation, but also with data analysis.

Data Analysis

Data Coding and Analysis

Prior to data collection, codes were created to match with Ely's (1990) conditions of change, Havelock and Zlotolow's (1995) CREATER stages of the change process, and the task- and people-focused dimensions of The Leadership Grid (1991), aided by Yukl et al.'s (2002) corresponding leadership behaviors. *A priori* codes for each of these frameworks are shown in Table 4. These *a priori* codes were used to not only identify themes and patterns within department chair stories of change, but also to guide pattern-matching between the CREATER model and department chair stories, and to provide categories for content or thematic analysis connecting Yukl et al.'s leadership behaviors to department chair stories of change. Content analysis of department chair stories allowed the qualitative data on department chair leadership to be partially quantified to provide a richer, more holistic view of the leadership phenomena presented in the data (as described in Ryan & Bernard, 2000). This quantification of qualitative information within a qualitative study provided an opportunity to present findings to an audience consisting partially of science department chairs in a manner that increases the chance that they will be receptive to, and be able to more readily relate to, the material. Boyatzis (1998) explained the importance of this "bridging" to meet your audience by citing Miles and Huberman (1984), "To make results from qualitative research accessible to others, one must employ different ways of organizing and presenting them" (p. 5).

A priori leadership codes were based on modifications of Yukl et al.'s (2002) work, which compiled specific leadership behaviors found within the literature into three

metacategories: (i) tasks behaviors, (ii) relations behaviors, and (iii) change behaviors. The specific behaviors listed within these metacategories were used to code department chair leadership behaviors identified in interviews and documents. Although Yukl et al. added a change behaviors' metacategory to the Blake and Mouton's (1962) categories of tasks- or people-focused behaviors, Yukl et al.'s focused on managers in their day-to-day activities and not on leaders who are in the process of enacting change. Because this current study investigated leadership in the context of the change process, the behaviors listed within Yukl et al.'s change behavior metacategory were transferred into either tasks or relations metacategories.

Specific behaviors associated with the resulting enlarged Task-Behavior metacategory included: (i) Planning short-term activities, (ii) Clarifying objectives and role expectations, (iii) Monitoring operations and performances, (iv) Monitoring the external environment, (v) Proposing an innovation or new vision, and (vi) Taking risks to promote necessary changes. Behaviors four through six were transferred from Yukl et al.'s (2002) change behavior metacategory. Specific behaviors found within the Relations-Behaviors metacategory included: (i) Providing support and encouragement, (ii) Providing recognition for achievements and contributions, (iii) Developing member skills and confidence, (iv) Consulting members when making a decision, (v) Empowering members to take initiative in problem-solving, and (vi) Encouraging innovative thinking. The last behavior in this metacategory was transferred in from Yukl et al.'s change behavior metacategory. An additional leadership behavior, building trust, emerged as analysis began and was added to the Relations-Behavior metacategory.

Table 4

A Priori Codes Corresponding to Change and Leadership Frameworks

Ely's Conditions of Change	Codes - Plain
Member's satisfaction with status quo	+SQ, -SQ, +/-SQ, 0SQ
Member's knowledge and skills	+KS, -KS, +/-KS
Availability of resources	+ R, -R
Availability of time	+TIME, -TIME
Rewards or incentives for members	+I, -I, +/-I
Member's participation in decisions related to the change	+D, -D
Commitment	+COM, -COM
Leadership	+LEAD, -LEAD
Havelock and Zlotolow's CREATER model codes	Codes - Underlined
Care	Care
Relate	Relate
Examine	Examine
Acquire	Acquire
Try	Try
Extend	Extend
Renew	Renew
Blake and Mouton's leadership axes codes, elaborated by Yukl et al.	Codes – Circled
General tasks or results focus	T
• Planning short-term activities	T-PLAN
• Clarifying objectives and role expectations	T-ORE
• Monitoring operations and performances	T-MONITOR
• Monitoring the external environment	T-EXTERNL
• Proposing an innovation or new vision	T-VISION
• Taking risks to promote necessary changes	T-RISKS
General people or relationship focus	G
• Providing support and encouragement	G-SUP/ENC
• Providing recognition for achievements and contributions	G-REC
• Developing member skills and confidence	G-PD
• Consulting members when making a decision	G-CONSULT
• Empowering members to take initiative in problem-solving	G-DELEGATE
• Encouraging innovative thinking	G-INNOTH
• Building trust	G-TRUST

After documents were collected and the first set of department chair interviews transcribed, *a priori* codes were confirmed and the code for trust-building leadership

behaviors was added. These codes were used to further analyze department chair accounts and document data that described various stages of the change process, barrier to change, and leadership strategies and behaviors. These codes, related interview segments and document portions, were charted as shown in Table 5, then analysis through content analysis with Microsoft Excel as shown in Table 6. Leadership behaviors were also charted on The Leadership Grid as shown in Figure 5.

Table 5

Example of Data Organization and Analysis

Ref	Stage of Change	Synopsis/Quotes	Barriers/ Conditions	Leadership styles	Notes
I7	Care	DC curriculum team; collecting final exams, realizing that there is a lot of variety in test difficulty; PSAE scores don't align with S grades But you can't just do this (change to CA) without T input – it has to be a team		T-MONITR T-PLAN	Team construction question?
D1	Care	Research supports the use of common assessments to insure consistency in instruction from teacher to teacher	-D +SQ	T-EXTERNL T-VISION	

Table 6

Example of a Portion of the Content Analysis Work with Microsoft Excel

DC	Ref	Stage	Conditions	T-PLAN	T-ORE	T-MONITR	T-EXTERNL	T-VISION	T-REFLECT	T-RISK
DC2	I5	Care	+SQ				1			
DC2	D1	Care	+R +TIME	2	1					

These analytical tables and grids, along with the results from the LSI, allowed triangulation of the data which increases the validity of the identification of department

chair leadership strategies and behaviors during specific situations as recounted by the participants. By using the descriptions of what was occurring during the change process at particular times, this study was able to identify whether a chair altered her or his leadership strategies or behaviors based on the stage of change the system was experiencing or on how the change was being accepted by the system.

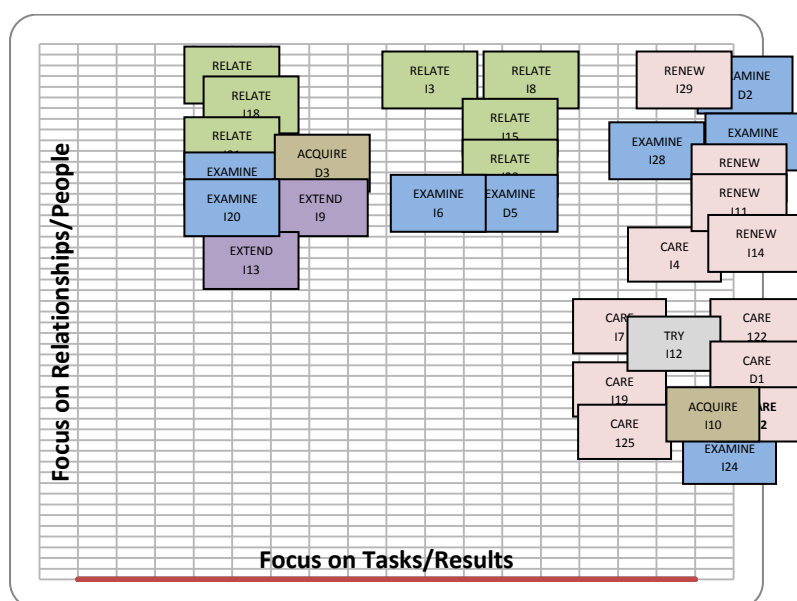


Figure 5. Example of Placing Data Evidence on the Leadership Grid (1991)

Related Pilot Study Findings

An IRB-approved pilot study was completed in the fall of 2008 that implemented some of the analytic strategies described in this study. This pilot study, based on a single case study investigation of a secondary school humanities department chair leading change, resulted in a model that connected the department chair's story with CREATER model through pattern-matching, and linked these stages with leadership strategies and behaviors evident in the chair's story (see Figure 3). This pilot study provided an

opportunity to refine the methodology of the current study, and results from this pilot study largely mirror the results of the current study.

Quality and Trustworthiness

Several aspects of this study's design enhanced the likelihood that its findings will be perceived by interested parties as valid and trustworthy. Guba (1981) stated that four characteristics increase the validity and the trustworthiness of qualitative research: Internal validity (or credibility), external validity (or transferability), reliability (or dependability), and objectivity (or confirmability).

Internal validity, also termed credibility by Guba (as cited in Shenton, 2003), is the congruence between what is being measured in a study and what the researcher thinks is being measured. This study aimed to measure how and why department chairs altered their leadership strategies and behaviors in response to, or in anticipation of, factors associated with the change process. The use of multiple sources of data and multiple methods (e.g., the department chair interview, documents, and LSI results) provided data source triangulation that increases credibility in the results of this study (Shenton, 2003; Yin, 2003). My use of The Leadership Grid to interpret the leadership behaviors of the department chairs was checked against the results of the professionally scored LSI, both of which are based on Blake and Mouton's (1962) leadership model. Although my own biases cannot be erased, the frameworks of Ely (1990), Havelock and Zlotolow (1995), and Blake and McCanse (1991) helped create and maintain a robust interpretive guideline. Collaboration and debriefing with supervisors and participants also provided feedback that helped reduce bias and increase credibility in reporting (cf. Shenton). In

addition, a logical connection between two concepts of leadership and the change process, including the use of negative cases, buttresses the credibility of the findings of this investigation (cf. Yin).

External validity, or transferability, is the ability to identify areas outside of the study to which findings can be generalized (Guba, 1981; Yin, 2003). Findings resulting from this study emerged from rich descriptions of cases provided by department chairs; segments of this rich data are provided to the reader, which aids in their ability to identify with these stories in a more holistic, context-rich manner. This multiple case study strived for analytical generalization, or theory-building, based on replication logic. The use of multiple cases as individual data pieces during certain points of the analysis allowed replicable themes to emerge; instances of unsuccessful cases were used further strengthened certain themes. This use of multiple cases increases the readers trust that the findings of this study may have some transferability to other areas of study and to other situations in which leadership and the change process are involved.

A third characteristic of trustworthiness and validity in qualitative research is dependability, or reliability. These terms relate to the sense that if a study could be repeated in the same context with the same participants, but with a different investigator, that the same results would be obtained (Shenton, 2003). In its purest form, this is impossible to assess; however, the use of member-checking, involvement of participants in portions of the analysis of the study, the full description of how this study's methodology, and the descriptions of the related context should provide the reader

enough information to suggest that other researchers would have reached similar conclusions.

Finally, objectivity, or confirmability, refers to the reader's ability to trust that the results are due to the data, and not the biases of the researcher. To help increase the reader's trust in the findings of the study, I, as the researcher, will be forthcoming with my perceptions of my own biases. I will also discuss my findings and interpretations with supervisors, participants, and peers to receive feedback on their interpretations of the data in light of my own.

Taken together, the proposed study's use of theoretical models and frameworks, multiple sources of data, multiple methods, and consultation with participants, supervisors, and peers should enhance the trustworthiness of its findings. The study's overall design, including the use of pattern-matching and the quest for replication logic, will also contribute the robustness of its investigation into the interplay of leadership and the change process as led by secondary science department chairs.

Researcher Reflections on Methodology

Three overlapping aspects of the data collection and analysis process produced unexpectedly rewarding outcomes: The series of three interviews, member-checking, and participants' involvement in data analysis. Although these aspects of the research were predicted to be helpful to this project, the depth of learning that each brought to this investigation was more rewarding than I originally expected. I would recommend these approaches if researchers work with participants who are similar to themselves in

education and job experiences, as was the case in this study. It seems that these commonalities allowed us to use the series of three interviews, member-checking, and participant-analysis of data to jointly paint a rich picture of how department chairs enacted leadership during the change process.

In this research project, the first interview served as a tool to gather department chair stories, after which I conducted a preliminary analysis through coding and basic content analysis with the resulting transcripts. In some research projects, this might be where the researcher ends their interaction with their participants. However, adding the extra two interviews not only allowed a researcher-participant relationship to grow, it also gave my participants time to further reflect on topics more thoroughly. This time for reflection resulted in additional layers of richness and participant-analysis each time we met.

After I conducted the preliminary analysis of department chair documents and transcripts of the first interviews, we met for a second interview, during which time I explained my coding system and reviewed their stories of change for member-checking. As the interview progressed, not only did I appreciate their additional reflections on their stories, but I also noticed that the department chairs began to adopt terms from the coding schema of this research and use these terms as tools of reflection and analysis. As they began to better understand the background of this research project, they became co-analyzers as we explored their stories. They also became more excited about the project itself: Many of them shared hypotheses or research ideas with me based on our discussions, and they were eager to see the results of this study once all the data was

compiled. The more we talked about their experiences within a framework of change and leadership, the more tools they gained to help them reflect upon and explore their experiences, and the more interested they became in learning about themselves and others in their profession.

Additional department chair reflection between the second and the third interviews was also evident by the way in which they viewed the compiled data that I shared with them at our final interview. They assessed the compiled data, asked questions about different aspects of how the analysis was conducted, and shared their thoughts on what the results might indicate. They also talked about how this would help them in their daily work, and how this information might be helpful to other department chairs. Similar to the increased level of depth provided by the second interview, this third interview allowed for further analysis and reflection of the topics being investigated, which resulted in unexpectedly rich information about how department chairs view their role in education, and in leading change within their departments.

Although it was the primary interview that provided the bulk of the data that informed my results presented in Chapter 4, the secondary and tertiary interviews opened a larger window into the emotional and reflective experiences of department chairs, and it provided me with “research” colleagues who offered additional analytical points of view and increased the creditability that results correctly represented the views of the participants. It also increased my understanding how this research could help department chairs as they attempt to make a difference in the lives of students through their role in

education systems. The findings related to department chair reflections and experiences uncovered through this series of interviews are detailed at the end of Chapter 4.

Conclusion

This qualitative multiple case study was designed to explore the connection between (i) the leadership strategies and behaviors used by secondary school science department chairs and (ii) change process stages and barriers. Data was collected via document analysis, interviews, and a leadership style inventory. These multiple methods and sources of data provided triangulation that increases the trustworthiness of the findings, and the multiple case approach increases the applicability of the findings to other change-leadership situations. Data was analyzed with the aid of *a priori* codes, which were used for theme identification, pattern-matching, and content analysis. Although this study operated under the philosophical and methodological umbrella of qualitative research, results are presented in a manner that not only portrays the rich and deep characteristics associated with qualitative research, but also attempts to display this richness and quality in a manner that provides an immediate and holistic relatability, and in a manner that appeals to audience members with a variety research backgrounds and affinities.

Change and leadership are two interdependent phenomena however, no research has connected change process frameworks with specific leadership models (Herold et al., 2008). This research aimed to address this gap in the literature. On a general, theoretical level, this study was designed to provide an expansion of the conceptual understanding of

the interplay between leadership and the change process, and also provide support for both Ely's (1990) conditions of change and the CREATER model of change process stages (Havelock & Zlotolow, 1995). On a more localized, practical level, this study was designed to add to our understanding of how secondary school science department chairs experience and use leadership strategies and behaviors to navigate academic and curricular change.

The following chapter presents the results and analysis from this investigation, which illustrate the interplay between the change process in both successful and unsuccessful change attempts, and the leadership strategies and behaviors as described by science department chairs participants, as well as unexpected themes that emerged from these department chair experiences. In the final chapter, implications of these results are explored, and recommendations based on the findings of this study are proposed.

CHAPTER IV

RESULTS

This research explored stories of change and leadership described by secondary school science department chairs. These stories and their accompanying details were collected from six participating department chairs through a series of interviews, change-related documents, and a leadership inventory. The analysis portion of this study examined department chair leadership as described in Blake and McCanse's Leadership Grid (1991) and further developed Yukl et al. (2002), as well as how and why department chairs adjusted their leadership based on the contextual conditions and barriers as defined by Ely (1990) and the change process stages as delineated by Havelock and Zlotolow's CREATER model (1995). Throughout this investigation, these analytical lenses were applied to individual cases, and across-case to answer the following research questions:

1. How do department chairs describe their experiences with barriers to change?
2. In what ways do department chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
3. Why do department chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
4. How do department chairs describe their experiences and roles as leaders during stages of the change process?

5. In what ways do department chairs alter their leadership behaviors and strategies during stages of the change process?
6. Why do department chairs alter their leadership behavior and strategies during stages of the change process?

The investigation of these questions found that department chairs reported common leadership patterns connected with contextual conditions of change and various stages of the change process. In all cases, department chairs discussed encounters with, and their responses to, barriers to change. Responses to change barriers ranged from people-focused leadership activities such as providing professional development, to task-focused leadership behaviors such as establishing role expectations for individual teachers. Department chairs described their leadership behaviors during different stages of the change process as predominately tasks-oriented behaviors in the beginning stages, followed by people-focused behaviors in the middle stages, then shifting back towards tasks-focused behaviors as the first cycle of change concluded. Finally, a leadership inventory (Life Styles Inventory – LSI) uncovered similarities between department chair leadership styles, as well as differences that appeared to result from not only department chairs' natural leadership predilections, but also from their responses to the contexts in which they work. Other emergent themes integrated in these stories of leading change included an explicit focus on “doing what’s best for kids,” the importance of teacher team construction, and the challenges of resistant teachers.

Data for this study was collected in the forms of (i) documents provided by the participating department chairs, (ii) notes and transcripts from a series of interviews, and

(iii) results from a leadership inventory (LSI). This data was then analyzed through pattern-matching and coding processes based on change and leadership frameworks related to this study. From this analysis, interpretations were made in an attempt to connect this data and the emerging patterns to established models and theories of leadership and the change process. These interpretations were further reinforced through member-checking by participants. Although interpretations of data can vary based on the analysts, using established frameworks for the analysis coupled with member checking increases the internal validity of the findings as presented in this study. This chapter presents the compiled data and related interpretations for each research question investigated through this project, and a discussion of these results and their implications are presented in Chapter V.

Research Question 1: How do department chairs describe their experiences with barriers to change?

Ely (1990) identified contextual conditions that enhance the probable success of change attempts. According to Ely, the absence of these change-enhancing conditions presents barriers to the change process (Nawawi et al., 2005). Ely (1990b) stated that “[t]he opposite of the facilitating conditions are hindrances that prevent implementation” (p. 11). This study therefore views the absence or opposites of Ely’s conditions for change as change process barriers that may need to be redressed or remediated by the change agent to enhance the chance of a successful change attempt. These change-enhancing conditions include:

- Dissatisfaction with the status quo

- Sufficient knowledge and skills of participants
- Availability of resources
- Availability of time
- Rewards or incentives for participants
- Participation of members in decisions
- Commitment to the innovation and change process
- Leadership

Successful instances of change consistently contained, or eventually achieved, more of these conditions than unsuccessful changes explored in this study (see Table 6). Assuming that the condition of “leadership” was evident in all cases, successful change attempts presented or achieved an average of six or more of these eight conditions, whereas unsuccessful change attempts achieved an average of four of these conditions. However, evidence presented in the literature (e.g., Bauder, 1993; Jeffrey, 1993; Ravitz, 1999; Read, 1994; Surry et al., 2006) suggests that Ely’s (1990) conditions are not all equal in their impact on the change process, and this study further adds to this idea of variable importance of these different conditions.

Of Ely’s (1990) eight conditions, “time” and “resources” were present in all successful and unsuccessful instances of change attempts. In all cases explored within this study, teachers were provided with time to work in teams through occasional late-start days (in which students arrive at school later in the day to provide professional learning community time for teachers), as well as through paid curriculum development time during the summer. The presence of these conditions implies the presence of

another, more global condition: “Commitment” of the administration to the change process. Although the granting of time and resources were not based on any specific change attempt, the availability of these factors implies that administration and the school systems in which these department chairs and teachers work trust their ability to determine and achieve changes that will enhance student experiences of school. And, finally, the condition of “leadership” was infused throughout department chair stories based on the fact that department chairs were leading the changes within their departments. These four conditions, “time,” “resources,” “commitment,” and “leadership,” are presented in Table 6 as conditions that were present, or eventually achieved, in all successful and unsuccessful cases investigated in this study.

Change-enhancing conditions that were absent, and therefore considered change barriers by this study, became apparent through teachers’ presentations of resistance. In their stories of change, department chairs described resistance from a teacher or a group of teachers as the most common and damaging obstruction to change implementation. Sources that fueled some instances of resistance can be traced to Ely’s conditions for change (1990), the most prominent being teachers’ “satisfaction with the status quo” and a deficient or absent level of “involvement in the decision-making process.” Another source of resistance not found in Ely’s conditions for change that emerged from department chair stories is teachers’ dissatisfaction with their department structure; more specifically, a dissatisfaction with the selection of the current department chair.

This study identified “dissatisfaction with the status quo” as the condition that most strongly predicted successful change. Interestingly, in all but one case, teachers

were satisfied with the status quo at the start of the change investigation; this presented a barrier that department chairs had to overcome. In these instances, department chairs described teachers expressing various levels of resistance due to their satisfaction with the status quo, which led teachers to feel little motivation to change.

An example of resistance due to teacher satisfaction with the status quo can be seen in DC1's report that her teachers expressed comfort with their grading system prior to accepting the change to a common grading schema: "I want to grade the way I want to grade, I've been grading this way for 30 years." DC2 described teachers' sentiments at the start of an unsuccessful change process as, "Some of them, maybe one person was like, 'if it ain't broke, don't fix it,' and 'We're just going to continue to do this because we don't want to lose it.'" DC4 was able to get her teachers over their resistance to change by working through their feelings that "this is the way I do things and I don't want to change." Similarly, DC5 reported he kept in mind that "teachers loved the class" as he planned how he would approach his teachers with the idea of a course curriculum change. In the stories of unsuccessful change reported by DC2, DC5, DC7, and DC8, teacher resistance due to satisfaction with the status quo overwhelmed teachers' desire participated in the change, but in instances of successful change, department chairs were able to move their teachers from satisfied to unsatisfied with the status quo.

Although teachers in all cases but one felt satisfied with the status quo at the beginning of the change process, department chairs in successful instances of change were able to consistently move their teachers to eventually feeling dissatisfied with the status quo. This movement was achieved mainly through strategic and subtle

professional development. This was not the situation for unsuccessful instances of change; in all four stories of unsuccessful change, the department chair was unable to move teachers away from their positions of feeling satisfied with the status quo. This ability to move teachers from satisfied to dissatisfied with the status quo is illustrated in Table 7.

Another commonly reported barrier to change that appeared to contribute to teacher resistance was a deficient level of participation in the “decision-making process.” As DC2 reflected upon an unsuccessful change attempt, he shared that it was the one group of teachers who had offices physically separated from the main department who eventually brought a curriculum change attempt to an end: “Looking back on it, the teachers who were physically in a separate location weren’t part of the original decision at all... they weren’t feeling connected.” During another unsuccessful change story shared by DC5, a district mandate for a change effectively removed both the department chair and his teachers from the decision-making process, so “teachers didn’t want to hear about [the change].” Other department chair stories of successful change lacked teacher-involvement in the initial change decision; however, the department chairs reported that they eventually brought teachers into later stages of the change process to help make decisions about details of a given change or the change implementation.

Table 6 outlines barriers to the change process in terms of Ely’s (1990) conditions of change that were present at the beginning of the change process whether they were eventually overcome by actions of the department chair or not, as well as the conditions that were present at the beginning of the process or eventually achieved through the

actions of the department chair. Although some successful changes began with a large number of barriers, department chairs in these cases were able to overcome these barriers through their leadership behaviors. Similarly, some unsuccessful cases of change began with limited barriers, and yet, due to leadership behaviors or contextual situations, these barriers were not redressed sufficiently for successful change to occur. Specific leadership strategies and behaviors used to address various change barriers present in the cases investigated by this study will be described later in this chapter.

Patterns that emerge from Table 7 include a higher number of conditions present in successful cases of change. Although unsuccessful attempts at change may have had less overt barriers, they also achieved less conditions necessary to help the change process succeed. Additionally, the condition dissatisfaction with the status quo appears to be crucial; this condition was only present in one story of change during early stages, but it was eventually achieved in all successful stories of change but not achieved in any unsuccessful instances of change. Final patterns that are illustrated by Table 7 include the helpful, but not sufficient conditions of available time and resources, adequate knowledge and skills, and participation in the decision-making process. These conditions were all present in successful instances of change, however, they were also present in some unsuccessful instances of change.

Other forms of resistance emerged from sources that could not be connected to Ely's (1990) conditions for change; these forms of resistance seemed to stem from the resisters' desire to gain power and importance that was not currently provided by the system. This type of resistance was exemplified in the stories told by three of the six

Table 7

Barriers and Conditions Described in Successful and Unsuccessful Change Attempts

Change Attempt	Barriers (eventually overcome or not)	Conditions (present or eventually achieved)	Successful
DC1 – Common grading and assessments	Satisfaction with status quo →	Dissatisfaction with status quo Sufficient knowledge and skills Incentives for teachers Involvement in decision-making Available time and resources Commitment and Leadership	Yes
DC2 – Course sequence	Satisfaction with status quo →	Dissatisfaction with status quo Sufficient knowledge and skills Incentives for teachers Involvement in decision-making Available time and resources Commitment and Leadership	Yes
DC4 – Common assessments	Satisfaction with status quo → Lack of knowledge and skills → Lack of involvement in the decision-making process (early) →	Dissatisfaction with status quo Sufficient knowledge and skills Involvement in decision-making Available time and resources Commitment and Leadership	Yes
DC5 – Course revisions	Satisfaction with status quo → Lack of involvement in the decision-making process (early) →	Dissatisfaction with status quo Involvement in decision-making Sufficient knowledge and skills Available time and resources Commitment and Leadership	Yes
DC7 – New freshman course	Commitment (administration resistant to the change)	Dissatisfaction with status quo Sufficient knowledge and skills Involvement in decision-making Available time and resources Commitment and Leadership	Yes
DC8 – Integration of inquiry into courses	Satisfaction with status quo →	Dissatisfaction with status quo Sufficient knowledge and skills Involvement in decision-making Available time and resources Commitment and Leadership	Yes
DC2 – Course sequence	Satisfaction with status quo Lack of knowledge and skills → Not involved in decisions →	Available time and resources Sufficient knowledge and skills Involvement in decision-making Commitment and Leadership	No
DC5 – Mapping Curriculum	Satisfaction with status quo Not involved in decisions	Available time and resources Commitment and Leadership	No
DC7 – Lab report format	Satisfaction with status quo	Sufficient knowledge and skills Involvement in decision-making Available time and resources Commitment and Leadership	No
DC8 – Course design	Satisfaction with status quo Lack of knowledge and skills	Available time and resources Commitment and Leadership	No

department chairs that described members of their department who had (i) been department chairs in their current school but stepped down or (ii) applied for the department chair position but were not chosen for the position.

In these situations, these individuals appeared to resist the initiatives of the department chair not due to a lack of conditions as described by Ely, but due to their perception that the department chair lacked what French and Raven described as “legitimate power,” in which followers recognize their leader’s authority over their actions, “referent power,” in which the follower identifies with, admires, respects, and likes the leader, or “expert power,” in which followers recognize that their leader possesses knowledge and skills that they value and require (Braynion, 2004). This lack of perceived power of the department chair could also be coupled with their loss of these particular teachers’ own power to influence their department. As Goltz and Heitapelto suggested in their 2008 publication, resistance may arise due to the fact that “organizational change often disrupts individual’s abilities to affect others’ behaviors in the ways in which they have become accustomed” (p. 5). I would add to that sentence, “or have desired.”

The social and political ramifications in these situations resulted in overt and covert resistance to changes chaperoned by the current department chairs. DC2 reflected on a specific resistor’s role by sharing that:

I think [his] being a much more veteran teacher among a lot of younger teachers, people were just listening to that person. And this person did not get this job, but I’m not sure that was a factor. And he had been here much longer than I.

DC5 described the impact of this specific type of resistor by saying, “I have the former department chair in my department, so that made it difficult. He was the biggest adversary. He was the cause of a lot of problems early on...” DC8 shared that, “There were four others in the department who went for the DC position with me. That has also contributed to the dynamic. Two of them who didn’t get the position thought that their ideas were better.”

This category of resistance due to dissatisfaction with the structure of the department not only impacted the change process, but also caused stress, and distress, in department chairs. As one department chair stated:

There were a lot of parking lot conversations about it, and it was anonymous kinds of things too, and it was very, very difficult. Someone called them ‘assassins’...those people who were trying to shoot you and you didn’t know who or what.

Another department chair stated: “... it was anarchy, they (teachers) were going to him (the resistor) for everything.” This department chair also shared that the difficulties due to this particular form of resistance had harmed his health and personal life, and since it wasn’t letting up even at the time of our interviews, he was considering looking for a different job. Another department chair brought up that not only had he confronted this particular category of resistance, but his former department chair had faced the same challenges. The stress was enough that this former department chair decided to step away from being the department chair to take a position within the department as a teacher instead. A summation of these experiences might include this

quote from a department chair reflecting on this category of resistance: “You talk about painful times in your leadership, and that was definitely painful.”

Throughout these stories of change attempts, department chairs described their experiences with barriers to change primarily in terms of teacher resistance. Some sources of resistance from teachers can be traced to the absence of Ely’s conditions of change, such as “satisfaction with the status quo” and “participation in the decision-making process.” In many cases, these sources of resistance were ameliorated by leadership actions of the department chair, such as by providing professional development and providing clear expectations of teachers’ roles in the change process. These two leadership behaviors exemplify Havelock and Zlotolow (1995) change agent roles of “catalysts” as department chairs provided professional development, as well as change “process helpers” as they helped teachers understand how they were expected to function during the change implementation.

Although “satisfaction with the status quo” emerged as the most powerful barrier to the change process, the barrier that may equal its power to block change attempts, and the barrier that may be more difficult to overcome, stemmed not from Ely’s (1990) conditions of change, but from power struggles initiated by teachers who desired the department chair position or teachers who did not recognize the department chair as possessing legitimate, referential, or expert power. This category of “contentious resistance” was, at best, only temporarily or partially assuaged by department chair actions; in most cases, this category of resistance either resulted in change initiatives to

be tabled indefinitely or slowed considerably. This category of resistance also caused the most emotional distress and professional doubt in department chairs.

Research Question 2: In what ways do department chairs alter their leadership behaviors and strategies in response to contextual barriers to change?

As department chairs described their encounters with change attempt barriers, they also articulated their responses to these barriers in terms of specific leadership behaviors. Leadership behaviors described by department chairs in this study were interpreted and categorized through The Leadership Grid (Blake & McCauley, 1991) as being task- or people-focused, then further subcategorized according to Yukl et al.'s (2002) work on specific leadership behaviors. Although the specific leadership behaviors identified by Yukl et al. were identified in stories within this study, their metacategory for change-related behaviors was disaggregated into task- or people-focused metacategories due to the fact that this study was focused on leadership behavior within the context of change. *A priori* codes were created for these specific leadership behaviors, and a code for a people-focused behavior, gaining trust, was added based on the emergent themes in department chair stories.

Task-oriented leadership behaviors based on the work of Yukl et al. (2002) and reinforced by themes that emerged from the data of this project included items outlined in coding Table 8. These categories of behaviors include planning activities, setting objectives and expectations, monitoring internal and external information, having a vision, taking risks, and reflecting on situationally based leadership.

Table 8

Tasks-Oriented Leadership Behaviors and Related Codes

Planning short-term activities (deciding what to do, how to do it, who will do it, and when it'll be done – it is a cognitive activity)	T-PLAN
Clarifying objectives and role expectations (guiding and coordinating activity, assigning tasks)	T-ORE
Monitoring operations and performances	T-MONITORING
Monitoring the external environment through research and networking, then analyzing and interpreting the information	T-EXTERNAL
Proposing an innovation or new vision	T-VISION
Taking risks to promote necessary changes	T-RISKS
Reflecting on own leadership for purposes of accomplishing tasks through work or through relation-building	T-REFLECT

People-focused leadership behaviors codes, outlined in Table 9, with the exception of the added trust category, were also based on the work of Yukl et al. (2002) and reinforced by themes in this research. These behaviors included supporting and encouraging followers, recognizing the work of others, providing professional development, consulting with and delegating to members, encouraging innovative thinking, and gaining trust of members.

Table 9

People-Oriented Leadership Behaviors and Related Codes

Providing support and encouragement (showing consideration, acceptance, and concert for the needs and feelings of others)	G-SUP/ENC
Providing recognition for achievements and contributions	G-REC
Developing member skills and confidence	G-PD
Consulting members when making a decision	G-CONSULT
Empowering members to take initiative in problem-solving with more autonomy and discretion	G-DELEGATE
Encouraging innovative thinking	G-INNOV
Modeling behavior that leads to people trusting you	G-TRUST

Leadership behaviors in response to a lack of knowledge and skills. As department chairs described their experiences with barriers to the change process, they also describe their leadership behaviors in response to, or in anticipation of, these barriers in predictable trends. For instance, as department chairs entered the change process, many addressed Ely's condition of "knowledge and skills" by providing teachers with professional development (G-PD) through formal professional training, discussions on research articles (T-EXTERNAL), or sharing information collected from their own department or school (T-MONITOR). Two department chairs (DC4, DC5) embarked on changes that required teachers to have certain competencies, such as an understanding of science education philosophy associated with course enhancements and the ability to write test items that would provide insight into students' science competencies. Teachers in the first school were provided formal professional development through school-, county- and national-level workshops. In addition to arranging professional development

(G-PD), this department chair also attended some of these workshops, even though he did not need the training, simply to “show support for teachers who struggled with the change” (G-SUP/ENC, G-TRUST). The other department chair arranged in-house training on test question writing and analysis for her teachers. A self-reflection document written by this department chair stated, “Providing them with basic training on good assessment writing was essential... to ensure that each of them had the skills and knowledge to complete the task given to them.”

Although many skills can be broken into smaller pieces and taught, other skills can prove more difficult to transfer. For instance, DC8 worked with teachers to increase the inquiry nature of their lessons. The articles he shared and the resulting department discussions had little effect on his resistant teachers; however, he had more success reaching these resistant teachers when he asked teachers who were participating in the change to share their successful lessons and laboratory activities. This leadership behavior not only served as professional development for resistant teachers (G-PD), but it also provided recognition for the work of their successful counterparts (G-REC). This department chair described his approach to this type of professional development designed to increase teacher knowledge and skills as, “expose, expose, expose.” The conclusion of this particular change story is categorized as currently unsuccessful but ongoing; the eventual success of this story may revolve around Ely’s condition of teachers having sufficient knowledge and skills to participate in the change process.

Leadership behaviors in response to a satisfaction with the status quo. The most powerful barrier department chairs described related to Ely’s (1990) conditions of

change revolved around teachers' "satisfaction with the status quo." The main strategy department chairs used to counter this barrier was to collect and analyze data internal (T-MONITOR) and external (T-EXTERNAL) to their departments. Information from these internal and external sources comprised a large portion of the documents provided by department chairs for this project. These documents fell into three categories: (i) science education articles, (ii) information and data from other schools, and (iii) data collected on departmental characteristics. Department chairs shared this data with teachers as a form of professional development (G-PD), and most expressed trust that as they shared this information, teachers would understand how certain changes could improve the status quo.

The barrier of "satisfaction with the status quo" was present in all but one successful case, and in all unsuccessful cases. In the successful cases, department chairs overcame this barrier through professional development in the form of sharing of information, but no unsuccessful cases were able to overcome this barrier. This suggests that this condition of "dissatisfaction with the status quo" was essential to the change processes in these stories of science department chairs leading change.

The action of sharing information with teachers to raise their attention to a possible area of change and to move them to feel dissatisfied with the status quo indicates that these department chairs were playing the role of a "catalyst" for change, according to Havelock and Zlotolow (1995) four roles of change agents. Catalysts entice people to change based on the questions they pose or elicit from others in systems that are considering a change. In these cases, department chairs provided the fodder for teachers

to consider, and either followed this information with questions, or allowed teachers to pose the questions themselves.

Two specific examples of department chairs acting as “catalysts” within a system include successful stories of change shared by DC4 and DC8. Both stated that one of their leadership strategies was to collect and share research articles in early phases of the change process with their teachers as part of their professional development (G-PD, T-EXTERNAL). These department chairs designed this professional development with the goal of prompting teachers to view a potential change as valid, feasible, and worthwhile. One department chair stated that she focused on “bringing in articles that explained why moving in this direction was a good idea... I’d find an article that would say exactly why we should be doing this.” She often used these articles to lead department-level discussions, “When I read this article, this is what I think. What do you think when you read this article?” The other department chair stated that, “I was able to convince them through a series of articles, so that was my main start.” This theme of providing information, followed by evocative questions, placed many of the department chairs in this study as playing the role of a catalyst during the EXAMINE stage of the change process through which they worked to entice teachers to consider change.

Three department chairs took slightly different paths in their roles as “catalysts” for change. DC1, DC5, and DC7 strategized to counteract teachers’ satisfaction with the status quo by gathering and sharing information from other schools who had completed changes similar to what the department chair had in mind (G-PD, T-EXTERNAL). Information gathered from other schools or departments included “common weighting of

grade categories was an idea shared by the math department” and analytical grids based on changes implemented in others schools, such as course sequence innovations. These department chairs used data from other schools to prompt teachers to consider the benefits and feasibility of similar changes for their departments.

A final way in which department chairs acted as “catalysts” for change included providing internal data to teachers. Teachers occasionally lacked information on their own performances; some of this data indicated a change might be needed (G-PD, T-MONITOR). This internal information helped teachers see their role in specific situations from different viewpoints, thereby increasing their understanding of where changes may be helpful. As one department chair described in his interview and through his documents, “For the past four or five years, their percentages of D’s and F’s, not only among the science courses, but among all courses in the district, is one of the highest.” This grade distribution knowledge increased teachers’ interest in investigating why their students had such low grades, and increased their awareness of how they were perceived by students, parents, and administration. Two other department chairs used the concerns of parents, voiced in email and phone communications, to illustrate how a change may not only help parents, but also the functions teachers engaged in regularly. One of these department chairs was able to say to her teachers, “You know what really helped (with answering a parent concern) was when I could respond and say, ‘the test is the same – we use the same test.’” This demonstrated to her teachers that a change to common assessments might not only aid student achievement and curriculum development, but also communication with parents.

In these successful cases of change, the department chair was able to move teachers from feeling satisfied with the status quo to feeling dissatisfied; this opened teachers' minds to the idea of change. However, in unsuccessful instances of change, teacher satisfaction with the status quo appeared to overwhelm the change process. In one unsuccessful story of change, teachers were not convinced that the new course sequence would have fewer limitations than what they were currently using. In another unsuccessful change attempt, teachers did not feel that a common approach to lab reports was feasible due to the variations between content areas. This particular department chair also sensed that teachers had other issues to deal with at the time, and she therefore decided to temporarily table the change: "I thought it would be such a simple thing, but it wasn't. We're trying to do all this stuff. How much can you put on teachers before it's too much?" Although this department chair views this as a failed change attempted, it demonstrates to her teachers that she cares about their well-being, and is will to forgo an initiative she is interested in based on their needs. This leadership behavior enhances the feelings of trust between teachers and the department chair which may prove beneficial in future endeavors (G-TRUST).

Leadership behaviors in response to a lack of teacher participation in the decision-making process. Another common barrier in department chair change stories was teachers' lack of desire to participate in, or their exclusion from, the "decision-making process." All stories of successful change involved teachers in at least some portion of the decision-making process, even if teachers had to be convinced to participate. Some stories of unsuccessful change never addressed this barrier. In other

stories of unsuccessful change, teacher-participation in the decision-making process led department members and their department chairs to recognize that the change being investigated may not be the most advantageous choice at that particular time.

In two successful instances of change, the broad idea of the change was adopted without teacher input, but teachers eventually participated in the change implementation process decisions and on the final details of the change. In one of these situations, the department chair told a teacher who expressed resistance by refusing to participate in the decision-making process:

We have two choices here: You can be part of this team to create the questions and have some input and then you get your ideas and ways of doing things become part of the way we all do it, or you can step back and be stuck with whatever the team develops.

Another said to her department, “Guys, this is being bandied about by administration – before we have this imposed on us, I want to know what you think.” Both of these leadership behaviors clarified the role and expectations of teachers (T-ORE) while exploiting the notion of the inevitable force of administration as a foil to help the change process along. They also elicited ideas and feedback (G-CONSULT) as a way to gather different perspectives on the situation, explore the feasibility of the change, and to increase teachers’ feeling of ownership in the change process. In these cases, department chairs played the role, as described by Havelock and Zlotolow (1995), of change “process-helpers.”

Other stories of change involved teachers in the decision-making process in early stages of the change process. In DC7’s story of successful change, teachers approached

her with their idea of a course sequence change. In DC2's story of successful change and the idea of a course sequence change was initially proposed by an outside stakeholder, then allowed to simmer for a few years as teachers discussed possibilities. Teachers eventually decided to pushed forward with their desire to implement a change. In these situations, teachers were not simply involved in the decision-making process, they fueled it. Department chairs in these cases did not need to play the role of catalysts, but they were essential in their role of change "process-helpers."

A frequent strategy department chairs (DC1, DC2, DC7, DC8) used as they consulted with teachers during the decision-making process was to elicit written thoughts and ideas from teachers (T-MONITOR, G-CONSULT). These written response forms were often included in the documents department chairs viewed as important to the change process. This process of collecting teacher input in written form allowed all teachers to have their ideas heard and allowed department chairs to analyze teachers' positions without being swayed by the loudest voice in the room. Department chairs then shared the compilations of the feedback with the department for further discussion. Some of the prompts on shared documents included, "Plusses/Minuses," "Professional areas of strengths/weakness," "After reflecting on the data, I think our team should do X to improve our course," "I affirm this decision/I do not agree with this decision because..."

In almost all change attempts, department chairs worked to elicit involvement in the decision-making process by tapping into teachers' feelings of duty to determine and act on what was best for their students. This leadership behavior not only reminded teachers of their job descriptions (T-ORE), but also inspired teachers to focus on their

power to make students' lives better (T-VISION). Some phrases shared by department chairs that accessed teachers' shared vision included, "If we all agree that this is the best thing for kids, why aren't we doing it?," "It's all about the kids," "If it's better for kids, then what else are you going to say?," "I said, 'We'll do what's best for kids,'" and "deep down, that's what it's all about." This connection between participation in the decision-making process and larger narratives such as focusing on the "good of the student," to incite teachers to contemplate a change could be considered a form of Ely's condition incentivization.

Leadership behaviors in response to internal department power struggles.

Three department chair stories contained reports of being challenged by teachers who passively or actively demonstrated their dissatisfaction with the current department chair. Department chairs in these cases stated that it seemed these particular teachers felt that they would have been a better choice for the department chair position, or they felt they could do a better job than the department chair. Based on these feelings, they engaged in subtle acts of resistance such as withdrawing from participating in the decision-making process at the last moment, or overt displays of insubordination such as challenging the department chair to step down. These resistant members made change implementation difficult or impossible for department chairs to lead.

In the first story of this form of resistance, the department chair attempted to involve a resistant group of teachers in the decision-making process (G-CONSULT) to reduce this barrier: "We had made the unanimous decision to do [this change], but teachers, even teachers who were hired for this specific purpose, weren't agreeing

anymore.” The department chair was unaware of their plans until teachers voted overwhelmingly to eliminate the change: “It felt like it came out of nowhere.” Upon reflection, this department chair traced the source point of this resistance to a veteran teacher who had also been a candidate for the department chair role, but was not chosen. In this case, the change was unsuccessful, but the department chair hopes that teachers will revisit this change idea on their own and attempt it once more.

In the second story of this form of resistance, a few members of the department were dissatisfied with the actions of the current department chair; however, one member, who had been the previous department chair but chose to step down, actively challenged the leadership of the current department chair. This department chair attempted to have open communication with this challenger to decrease his resistance (T-ORE):

So we had a talk and I told him, in a not-so-professional way, that it is your job to teach and my job is to make sure that this department runs well. And he said, ‘So what do you want me to do?’ I was like, ‘I want us to have these arguments, I’m ok with that, it’s within closed doors, but as soon as you leave and I leave, it’s back to normal, we’re moving on, but we know that we know that our hearts are in the right place – it’s for the students. We’re doing it for the students and for the benefit of the staff.’

This particular departmental situation has resulted in a mix of successful and unsuccessful change attempts; however, based on the comments of the department chair, the overall environment in this department remains challenging.

The department chair in the third case attempted to reduce the impact of this form of resistance through professional development (G-PD) and consultation (G-CONSULT); however, once it became clear that these leadership behaviors were not going to remove this barrier to change (T-MONITOR), he decided to involve his administration (T-RISK)

to emphasize the need for change with one specific content area team. This particular change was classified as unsuccessful; however, this second attempt with the added administrative force may prove more fruitful since his previous attempts at bringing these teachers in on the change process had thus far failed. Although this move may damage the level of trust he had with these teachers, it may increase their perceptions of him having legitimate power in his role within the school system.

When department chairs in this study expected or encountered barriers to the change process, they often engaged in predictable trends of leadership behavior. These general connections between commonly identified barriers and department chair leadership responses are diagramed in Figure 6. Predictable leadership responses included providing professional development (G-PD) if teachers lacked knowledge and skills to participate in or understand the need for a change. If teachers felt satisfied with the status quo, department chairs shared internal department data and information (T-MONITOR) and information from outside of the department, such as data from other schools or research articles (T-EXTERNAL) to illustrate how situations could be enhanced. Less predictable trends emerged when departments chair worked to entice teachers to participate in the decision-making process. Some department chairs centered teachers on their calling to “do what is best for kids” (T-VISION), and others used a stronger approach by reminding teachers of their duties to the profession and their role within the department (T-ORE). All department chairs who worked to involve teachers in the decision-making process held discussions on the possible changes and elicited feedback on teachers’ ideas about and perceptions of the situation (G-CONSULT).

Finally, a range of leadership behaviors emerged when department chairs were faced with less change-specific resistance, although these had only limited affect.

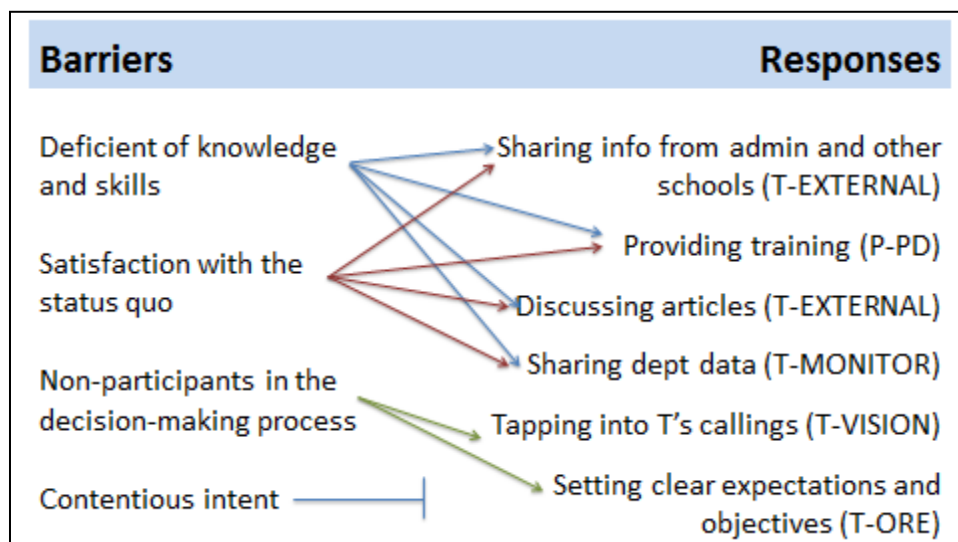


Figure 6. Common Barriers and Leadership Responses

Research Question 3: Why do chairs alter their leadership behaviors and strategies in response to contextual barriers to change?

In the stories of change explored in this study, department chairs switch from one leadership behavior to another in response to the department context naturally, whether that context included teacher resistance, apathy, or enthusiasm, parent displeasure, student performance, educational trends, or administrative mandates. During interviews, department chairs struggled to answer “why” they chose different leadership strategies in response to change barriers; they reported that most of the modifications in their leadership behaviors felt instinctive to them, and were therefore difficult to reflect upon. In these situations, interpretations of their strategies and behaviors were made during the analysis phase of this study. However, department chairs themselves were able to

connect two variations in leadership behaviors with the “why” questions of this research project: Planting the seeds of ideas within the guise of professional development and team creation. Additionally, although many leadership adjustments appear to be seamless interpersonal interactions in most of department chair recounts, some of the leadership adjustments present in the more challenging situations provided rich insight into this research question. These insights were extracted not only from documents and interviews, but also from the leadership inventory (LSI) results.

In most of these explorations of “why” department chairs altered their leadership strategies and behaviors when facing change barriers, it was the department chairs’ lack of power over their teachers due to the structure of secondary schools that prompted their leadership choices. Very few department chair leadership strategies or behaviors were direct; most were subtle or occurred behind-the-scenes. In certain fields, the ability to remove non-cooperative employees or withhold raises or bonuses provides simple incentives for members to embrace their role as a team player. In secondary schools, however, once tenure is achieved, incentives for cooperation reside mainly internal to the individual teacher. Therefore, department chairs relied on strategies and behaviors that accessed these internal motivators within their teachers.

In general, most department chair motivations for altering their leadership behaviors and strategies in response to change barriers revolved around their ability to subtly influence circumstances. All department chairs in these stories agreed that they engaged in manipulation of situations to achieve their goals; however, although they accepted the behind-the-scenes aspect of that expression, they rejected the negative

connotations of that word. Their manipulation was more of a use of subtle influence over contexts that created conditions that enhanced the chance that their teachers would understand the need for a change and feel motivated to participate in the change process. In other fields, leaders may have the luxury of being able to state that a change will occur without first gaining the buy-in of their members, but in secondary schools, department chairs have little power to unilaterally impose a change. Although this inability to force a change presents challenges, it may ultimately provide a stronger change implementation as a result (this is discussed more thoroughly in Research Questions 4 and 5, as well as Chapter V).

Department chairs altered their leadership strategies and behaviors when they encountered or anticipated barriers to change because they intuitively understood that they needed to create the conditions necessary for change acceptance and participation. Most barriers present in the change stories explored in this study emerged via teacher resistance, and therefore, department chairs in these cases focused their leadership behaviors on subtly influencing the context in which their teachers operated. For instance, prior to introducing a change idea, many department chairs strategically shared information with their teachers from internal or external sources that indicated where changes may benefit the department. Trusting that the teachers in their departments were motivated to provide the best education possible for their students, and trusting that they could follow the logic that was in the information presented, department chairs were often able to bring teachers in on the idea of a change before the idea of a change was

verbalized. This often worked for entire departments, or at least with key teachers.

In this study, this subtle influence was termed, “planting the seeds of the idea of change.”

Department chair motivation for planting the seeds of the idea of a change seems to stem from department chairs’ desire to have teachers perceive that they were the source, at least partially, for the change idea. This perception enhances teachers’ feeling of ownership of the change idea, and their feeling of control over their work lives.

Teachers serving as the perceived source of the change also allow a change to take on the feeling of a ground-up movement. Ground-up change initiatives have the benefit of enhancing teacher investment, but teachers may lack the time, resources, and knowledge to complete the change initiative (Borman, 1998). This benefit-drawback combination to ground-up movements led Darling-Hammond (2001) to suggest that the most effective change initiatives start from the bottom, but have support from the top. This balance between teacher-initiation, whether real or perceived, and leader support is illustrated in many cases found within this study.

Department chairs understood the power of the perceived source of a change, and this prompted them to use suggestion and targeted professional development to bring teachers on-board to the change process. To accomplish this, department chairs adopted the change agent role of “catalyst” as they shared ideas and information as if they were simply participating in interesting conversations, all with the hope that teachers would become more inclined to see possible areas of change as beneficial. This was seen in DC8’s sharing of video clips of comedians and articles from well-known scientists to inspire teachers to consider fresh approaches to their curriculum. DC1 was able to get

conversations going on common assessments and grading when she shared that the most effective way to deal with parent requests for teacher changes was when she is able to say “the tests are the same.” DC4 provided teachers with access to common assessment data, which led to teacher-initiated discussions; he stated that “teachers were beginning to see it on their own – these conversations would have never occurred five years ago.” These department chairs provided this information aware of the general direction they hoped the department would move; however, they conscientiously avoided directly addressing the change they had in mind, hoping that teachers would come to similar conclusions on the possible need or opportunity for change.

After this use of subtle influence had accomplished what it could, department chairs still occasionally encountered barriers that emerged from individuals who were overtly against change. In these cases, department chair choices of leadership behaviors evolved from subtle influence to (i) direct discussions individual teachers or (ii) peer pressure. In most cases, department chairs at this point had made a case for a change, and at minimum, key teachers understood this need and were primed to participate in the change process. However, if a few teachers expressed resistance for what the department chair saw as selfish or non-logical reasons, the department chairs applied direct or peer pressure to the remaining resistant teachers. Direct pressure, although rarely used, involved straight-forward one-on-one discussions during which department chairs would delineate the objectives of the change and their expectations for the teacher’s role in the change process. Peer pressure was more commonly used and involved the use of

statements that revolved around the idea that the change was “best for kids,” or highlighting other teachers’ successes with or enthusiasm for the change.

Through subtle influence, direct discussions, and peer pressure, most department chairs were able to create conditions for change and prompt the majority of their teachers to feel dissatisfied with the status quo and willing to participate in decision-making steps related to the change or the change process. However, in cases in which these strategies did not work, department chairs explored other avenues to overcome these barriers, primarily team membership construction.

Four of the six department chairs discussed the importance having the right mix of teachers on teams that were attempting change, and when that mix was off-balance, they felt the change process was in jeopardy. Science teachers naturally segregate into content area teams, although teachers can frequently cross disciplines. Many biology teachers, for instance, can also teach chemistry, and many Earth science teachers can also teach physics. From a department chair point of view, this flexibility in teaching domains helps with scheduling as fluctuations in student enrollment occur year-to-year, as well as with team construction based on teacher collaboration strengths.

In situations where a change was in trouble due to a particularly resistant teacher on a team, department chairs in this study either: (i) reorganized teams, (ii) joined teams as teachers themselves, or (iii) released teachers if they were non-tenured. Each of these actions is associated with leadership behaviors delineated in this study, and were directly linked by department chairs to “why” they altered their leadership behaviors. These behaviors also point to the inability for department chairs to remove or externally

incentivize teachers' motivation to cooperate with department initiatives. In most of these cases, department chairs would have been able to more efficiently institute a change through the use external pressures than by their need to artificially manipulate team membership to reduce resistance.

Department chair recognition that using different leadership tactics connected to team construction led DC1 to state that she “had to re-organize the team (to spread out resistors), I gave them goals to meet; they didn’t get it, so I had to release them” (T-ORE, T-MONITOR, T-RISK). DC4 stated that in the beginning,

I kind of did it (the making of teams) randomly. I do it more strategically now. You need a group leader to move it along. I got better at that, strategically making sure that in every group, there was someone I could depend on (T-PLAN, T-MONITOR).

DC5 saw the value in teams having a leader that he could trust because “they would mediate the nay-sayers. I had to move them around to other courses, though, because I needed that balance. I positioned teachers in courses, that enables change” (T-PLAN, T-MONITOR). Two department chairs joined teaching teams that were struggling with changes to model behaviors and guide teachers on a more informal level (G-PD, G-SUP/ENC), as well as to monitor the team more closely (T-MONITOR). One department chair made this move despite the fact that this particular course was not the most enjoyable for him to teach: “So I’ll be teaching bio next year for the first time...” Another case exemplified the lack of power department chairs have over personnel decisions once teachers receive tenure; he basically had to wait to follow through with a change involving a particular team until his biggest resistor retired.

In these examples of department chairs strategizing team membership, their motivation revolved around the perception that team membership impacted the effectiveness of the team's tangible or intangible products. Department chairs also needed department teams to be fairly self-sufficient and self-sustaining. This understanding of the role teams play within the department explains "why" department chairs were aware of their team construction strategizing. For change to occur within a team-based system, the team members must (i) have a common goal, (ii) be willing to continuously learn, and (iii) work together well (Druskat, 2002). Without these three factors, teams will not be able to efficiently enact or embrace change initiatives. In situations in which department chairs reorganized teams, difficult team members were moved, when possible, to teams that were not actively working towards change. This created hospitable conditions for the team achieve a common goal while being guided by the department chairs of this study. However, it saddled other teams not involved with the change, or stronger teams that could withstand the new member, with a difficult and possibly damaging teacher.

Despite the fact that most department chairs altered their leadership behavior in a natural manner throughout the change process and in response to change barriers, their leadership choices are easier to interpret when one considers the lack of power department chairs have over personnel. Most of the leadership behaviors access by department chairs in this study relied on subtle or behind-the-scenes actions, such as planting the seeds of the idea change and constructing teams. Other answers to "why" department chairs adjusted their leadership behaviors emerged in this research from

department chairs' stories of experienced with particularly challenging situations.

These next examples further emphasize the challenges faced by leaders who possess little power over the members of their departments.

One story of change that is currently classified unsuccessful might actually be re-categorized as simply stalled, or in-slow-progress, exemplifies this emerging answer to “why” department chairs alter their leadership behavior. This department chair has not abandoned the change attempt and is currently still working on new approaches to involve his teachers in the change. Due to teacher resistance, perhaps stemming from a lack of knowledge and skills that may or may not be remediable, this change appeared to have failed early in the change process. Undeterred, this department chair recognized that this group of teachers seemed unmotivated to become better at their craft (T-MONITOR), so he attempted to provide inspiration by sharing data with teachers in this group, as well as innovative lab activities and lessons from within their department (“Sometimes I prod them by telling them that the person they're working with right down the hallway has some really good ideas”), reading and writing suggestions from English teachers, and articles on best practices for science education (G-PD, G-INNOTH). However, these teachers still did not respond positively to the change attempt.

He then changed leadership tactics by having teachers reflect on their work (G-CONSULT). When he asked them to reflect on their classes, these teachers consistently found fault not with themselves or their approach, but with their students. Their belief that the problems were stemming from their students was so strong that they felt comfortable putting this in their written team meeting notes: “students complain about

taking a lot of notes, students struggle with reading directions, students leave questions blank, students report a lack of interest in the topics...”

After this department chair repeatedly attempted to inspire teachers and provide professional development, it appeared that this change attempt was not going to succeed. However, due to his strong belief (T-VISION) that this change was needed, and through his consultation with his assistant principal, more forceful directives have been shared with these teachers (T-ORE). The department chair reported that:

This year I brought in the principal to help co-facilitate the biology team meetings. I needed his credence and his clout to carry this out. I got him on board and I'm happy because I can only say so much in my position.

This statement indicates that this department chair's motivation for bringing his administrator into this difficult situation stemmed from the limited power department chairs possess when working with underperforming teachers. Based on the fundamental job description of the secondary school department chair, all participants in this study lacked coercive or reward power, through which leaders are able to punish or reward followers; they therefore relied on legitimate power through which followers accept their role as leader of the department, referent power through which followers are drawn to and admire their leader, or expert power through which followers recognize that their leader brings important and valued knowledge and skills to their team. When those latter powers are not acknowledged by teachers, and if department chairs are unable to convince teachers to participate in a change or to grow in an identified area of need, their ability to remove that teacher or force a change is almost non-existent.

This department chair's choices in using various evolving and responsive leadership approaches to the barriers presented in this challenging situation is mirrored in his leadership inventory (LSI) results. The authors and professional development providers who use the LSI for profession training workshops recognize that leadership styles can change based on personal growth efforts, the context in which one works, and traumatic events in a person's life (LSI, 2011). Based on these influencing factors, they recommend that the LSI be taken frequently to chart a person's growth and responses to changes in their work and personal lives. This particular department chair's LSI results displayed some of the strongest scores among department chairs in this study in the Humanistic-Encouraging and Affiliative positions, which corresponds to his persistent attempts to provide information (G-PD) and encouragement (G-SUP/ENC) to this group of resistant teachers. However, their resistance, coupled with the history of toppled department chairs and inability for members of this department to get along with one another ("They don't want to work with each other. When it's a personality conflict, I can't legislate that, all I can do is put them in a position to succeed and they don't always do that."), may have been a factor in this department chair's interest in collaborating with his assistant principal once he realized that these teachers were not going to cooperate under the current approach. This is also reflected in this department chair's LSI Avoidance score. Although this score was moderate, it indicates a relative lack of confidence in his ability to effectively work with people within his department, or a realistic view of what he can accomplish based on the systems-level position he holds.

Unlike this department chair who is continuing to pursue a change, two other department chairs who experienced failed change attempts recognized that in their specific situations, continuing with their change process would not result in success and might also result in departmental damage. Faced with these probable outcomes, both of these department chairs put their changes on indefinite hold. Department chairs in these situations chose to keep the peace for the good of department rapport as well as their other programs and operations, by sacrificing what they viewed as a less vital change.

In one situation, the department chair decided that the benefit of the change was not enough to justify the amount of work teachers would need to do, nor the amount of distress teachers would experience. This particular leadership behavior is mirrored in her LSI scores as being a moderately constructive leader, indicating that she is not overly concerned with establishing relationships and accomplishing tasks. It is also mirrored in her low passive and aggressive defensive cluster scores, indicating a comfort with pulling back from a change without worrying about her needs for security or her feeling of self-worth.

In the other case, the department chair relinquished a change attempt based on an unexpected level of resistance to the change idea. As this resistance gained momentum, he asked for written feedback on previous department decisions. Responses to one particular decision received unanticipated levels of resistance which emerged in a hurtful manner. Although the department chair believed that this change would benefit students, he let the change attempt end. While this department chair would support this change in the future, he stated, "I don't think it would be a good thing for me to bring up; I think it

would be better for someone else to bring it up.” This feeling and response to his department context is reflected in his moderately high LSI Dependent and Avoidance scores, which indicates this department chair may have “some doubts about taking responsibility and being held accountable for your actions” (LSI, 2011, p. 31) and “may hesitate and have reservations over taking on new responsibilities” (p. 35).

The final case that lends insight into the research questions of why department chairs alter their leadership in response to contextual barriers to change was, at the time of this study, experiencing the most contentious working environment created by the behavior and attitudes of certain teachers. This group of teachers was openly aggressive towards this department chair, to the point of asking, “When are you leaving, because I want your job.” This department chair had also recounted a conversation with a virulent resistor in which the department chair said to this teacher, “And if you want this job, you have it and I’ll teach your classes.”

Despite certain teachers who are openly confrontational, this department chair has been able to create positive relationships with other teachers in his department which has helped him spur changes that benefit students. This ability to build relationships while remaining strong against distracting factions within his department requires different leadership behaviors for each group of teachers. This is reflected in his moderately high Humanistic-Encouraging LSI scores which indicate his ability to relate to and inspire cooperative teachers in his department. However, the contextual barriers presented by overt resisters have prompted this department chair to move towards a protective leadership stance, which is evident in his high passive-defensive scores and moderately

high aggressive-defensive scores. Both of these scores emerge in response to adversarial environments, and point to a move towards securing safety through the use of task- and people-focused behaviors.

In the stories of change investigated in this study, department chairs relied mainly on subtle leadership strategies and behaviors due to their lack of power over the teachers in their departments. These subtle behaviors may have required department chairs to put in more effort or taken more time in their approach to the change process, but these approaches may have resulted in more successful change attempts than if they had used power to influence the change process (this is explored more thoroughly through Research Questions 4 and 5, as well as in Chapter V). Although some leadership behavior changes have prominent strategies and reasoning behind them, such as the strategies seen in team creation or planting the seeds of an idea of change, most leadership behaviors in response to barriers evident in this study appeared to department chairs as simple human interactions in different circumstances. In normal situations, these leadership behavior adjustments felt natural and obvious to department chairs: If teachers lack the knowledge and skills to institute a change, leaders provided professional development. Although department chairs may not have been aware of why they had engaged in these activities, it is clear that their motivation was to create conditions that would enhance the probability of successful change. In the department chair stories of intense challenge, illustrations of why department chairs adjusted their leadership behaviors in response to change barriers emerged clearly from their stories. In these more extreme situations, department chairs strategized and responded in ways that did

not feel natural to them, and therefore the reason for the changes in their leadership behaviors was more evident to them upon reflection.

Research Questions 4 and 5: How do department chairs describe their experiences and roles as leaders during stages of the change process? In what ways do department chairs alter their behaviors and strategies during stages of the change process?

Most department chairs within this study portrayed their change process experiences in a manner that aligned with Havelock and Zlotolow's CREATER model stages (1995). Due to the limited presence in department chair stories, however, the ACQUIRE stage was combined with the TRY stage during the analysis portion of this study. *A priori* codes used in this investigation were based on the stages of the CREATER change model, and outlined as described by Havelock and Zlotolow below:

- CARE: This stage is characterized as a time when change agents assess current situations and related information. During this stage, leaders notice where changes may be beneficial. It is also a stage where an evaluation the presence of Ely's conditions for change may be most helpful, although these conditions should be attended to throughout the change process.
- RELATE: In this stage, the change agent builds relationships with members and develops interpersonal strategies that may help alleviate the influence of resistors.
- EXAMINE: The decision to attempt a change to solve an identified problem or take advantage of an opportunity occurs during this stage.

- TRY and ACQUIRE: During the TRY stage, details of the change decided on in the EXAMINE stage are determined based on the context in which the change will occur. Change agents must ACQUIRE funds, time, space, and equipment needed for the change.
- EXTEND: As the change is initiated and preliminary results are communicated, the change may enlarge or spread to other areas during this stage.
- RENEW: In this stage, the change agent evaluates the impact of the change and its implementation, then determines how to correct errors and continue progress. The leader also communicates successes to nurture the establishment of the change within the culture of the system.

Interpreting the descriptions of these six successful and four unsuccessful stories of change provided a general, progressive interplay between department chair and teacher actions as different CREATER stages were encountered. This general progressive pattern appears to consist of department chairs (i) working on their own as they observe and assess situations, (ii) strategizing how to approach their teachers about the need for a change, then (iii) gently bringing teachers into the exploration of the idea of a change. Once teachers began to understand and accept the benefits of a possible change, the department chairs (iv) released some control of the details of the change design and implementation to their teachers, while still providing guidance and support. As teachers implemented the change, department chairs continued to support teachers and they (v) organized situations in which teachers involved with the change could share their

progress with others. Finally, as results of the change became available, department chairs (vi) retook some of the control by gathering, evaluating, and presenting the data, as well as determining with teachers what the next steps should be to enhance the change. Based on this general trend, I was able to connect department chair stories to different stages of the CREATER model and identify specific leadership behaviors to each stage. This analysis and interpretation of their stories provided answers to Research Questions 4 and 5, both which focus on department chair strategies and behaviors during change process stages.

A slightly more in-depth elaboration of the general change process trend connects the stages of the change process with leadership behaviors department chairs described in their stories. These connections include reports of primarily using tasks-oriented leadership behaviors during the CARE stage of the change process. The department chairs usually conducted these activities without the knowledgeable involvement of teachers. The main activities department chairs conducted during this stage were monitoring data and contexts inside and outside of their departments (T-MONITOR, T-EXTERNAL). As the change process progressed, department chairs indicated they increased teachers' involvement and relinquished some control over the change process during the EXAMINE stage. While department chairs recounted exhibiting more people-focused behaviors during this stage, especially consulting (G-CONSULT), they also maintained their role as creators of the structure that guided the work of teachers. In this role, they often played the role of "catalyst" and "process-helper." Their work as change process-helpers continued in the next stages of the change process. As teachers began to

accept the need for a change, department chairs further removed themselves from the detailed work of the change implementation, while still providing support, during the TRY stages. Department chairs felt that delegation (G-DELEGATE) of change-related tasks allowed teachers to explore the implications of the change, use innovative thinking to adapt the change to their specific situation (G-INNOTH), and continue the change process into the EXTEND stage. Finally, as the RENEW stage began, department chairs reclaimed some control over the change process to provide analysis (T-MONITOR). This analysis was then used to continue the CREATER cycle to adjust and cement the change within the department.

A more detailed look at department chair behaviors during the CARE stage found department chairs working on their own, observing and analyzing their department characteristics, needs, and relationships with the larger context. The reported activities of department chairs matched Havelock and Zlotolow's (1995) description of CARE stage as the time in which leaders realize a change would benefit the organization and they begin planning for the possible change implementation. Leadership behaviors most prominent in the stories of department chair change processes during this stage include tasks-focused behaviors such as planning of activities and approaches (T-PLAN), collecting and assessing data from within the department (T-MONITOR), and consulting sources of information outside of the department and current research (T-EXTERNAL).

During this stage, department chairs recalled working mostly independently within the world of the mind: They made observations, collected data, evaluated situations within their department, read research, and identified external pressures.

Department chairs also evaluated conditions of change, such as teachers' level of knowledge and skills and their opinions of the status quo. Department chairs were active, but behind-the-scenes; they were aware that they were engaged in important work, but this work was not shared with others until the department chairs felt they had spent enough time understanding their department and its needs. As one department chair stated, during this stage, leaders need to patiently work to understand the system in which they are hired: "You can't come in as a new leader and expect to turn everything around in a year."

This behavior described by department chairs during the CARE stage does not match any of the four change agent roles described by Havelock & Zlotolow (1995) such as the catalyst, resource-linker, process-helper, or solution-giver, all which are described as beginning *after* the need for a change have been uncovered. Although these actions undertaken by department chairs during this stage provided them with information that would prepare them for their future roles in the change process, their exact role in which they conduct the work that helps uncover the needs for a change has yet to be defined. An interpretation of this behaviors described in this study during the CARE stage suggest that the role department chairs played during this stage was that of an independent "researcher" and "strategizer."

In DC1's story of successful change, her main role during the CARE stage was that of a "strategizer." The external pressure that triggered the change process in her department was the rapid increase in their student population; this population growth required not only a hiring rush, but also resulted in the building of a freshman campus (T-

EXTERNAL). DC1 realized having teachers on two campuses would require more consistency between courses than had been necessary in the past. Additionally, this department chair realized that as an increasing amount of grade and course information became available to parents electronically, a higher level of conformity between teachers would be needed to ensure parent satisfaction with teaching and grading practices (T-EXTERNAL). From examining variation in courses and teaching practices in her department, she recognized that increasing consistency would require a large amount of teacher effort (T-MONITOR).

DC2's community also experienced a large population increase that resulted in the opening of a freshman campus (T-EXTERNAL). This new campus presented a need, as well as an opportunity, to align curriculum between progressive science courses. Around the same time, a science education trend of offering physics to freshman had caught the attention of the community (T-EXTERNAL). This CARE stage was the start of DC2's successful change story, as well as his story of unsuccessful change, and in both instances, his main role was that of a "strategizer" to answer the question: How could he and his department transform this challenge into an opportunity?

Echoing DC1's theme of common assessments, DC4, played the role of a "researcher" by collecting final exams from teachers. From examining these exams, she found wide variation between the levels of rigor with single courses, and in some cases, the rigor on the final exam of a regular-level course was higher than the rigor on the honors-level final exam (T-MONITOR). This, coupled with the growing trend and research on common assessments (T-EXTERNAL), prompted this department chair to

explore the idea of common assessments with other department chairs in her school.

As she continued to investigate this idea, she began to play the role of a “strategizer,” working to determine how she would share these ideas with her department and how she would construct teams (T-PLAN).

Unlike DC1, DC2, and DC4’s stories of change in which the CARE stage was navigated by established department chairs, the CARE stage for DC5 began immediately upon being hired. His CARE stage consisted of members of administration instructing him to change a course based on parent concerns (T-EXTERNAL). After examining the course content, he agreed that there was a need for a change (T-MONITOR); unfortunately, he also recognized that the teachers would not be interested in changing the course because they “loved the class.” In addition to this source of predicted resistance, he also expected that teacher resistance would be high due to the history of administrative turn-over which had decreased teachers’ level of trust in the system (T-MONITOR); as one teacher asked this department chair, “Why should I get to know you? You’re about to leave.” This prompted DC5 to play the role of a “strategizer” as he worked to figure out how to approach teachers with this change expectation in this early stage of the change process.

DC7’s successful change process also began upon her hiring, but the request for change came from the teachers of her department, not her administration. This change attempt was unique in this study because the source of the change was teachers, and this resulted in the department chair playing the more traditional role of a “process-helper” as described by Havelock and Zlotolow (1995). This allowed her to access slightly more

people-focused leadership behaviors during her quick CARE stage, such as consultation (G-CONSULT), as she helped teachers navigate the change process in their roles of change agents.

Unlike her story of successful change, DC7's story of unsuccessful change originated from her thoughts, not her teachers. This provided her with more time to research her ideas and plan her approach. Her main roles during the CARE stage were that of "researcher" early on, then that of "strategizer." Her main leadership behaviors during this stage were mainly task-focused, such as planning activities (T-PLAN), monitoring internal procedures (T-MONITOR), and consulting with external sources of information (T-EXTERNAL) to begin her exploration of this possible change.

Both of DC8's successful and unsuccessful change stories share similar origins and therefore similar leadership behaviors during the CARE stage. This department chair had previously been a teacher in this department and had witnessed the development of courses, as well as the departmental dysfunctionality generated by some teachers. These observations, along with an administrative push to account for how laboratory time was used within the department, prompted this department chair to investigate how science classes were being taught (T-MONITOR). At the same time, the trend of inquiry teaching was receiving more attention in professional literature (T-EXTERNAL). Although this department chair understood the nature of the shortcomings of some of the courses in his department prior to his starting as the department chair, he continued to play the role of a "researcher," but he mainly spent his time as a "strategizer," working to

determine how he could help his teachers see the possibilities that lie with inquiry teaching approaches.

These department chair stories of both successful and unsuccessful change reveal that the CARE stage consisted primarily of tasks-focused leadership behaviors, with few people-focused leadership behaviors. Leadership activities associated with the task-focused behaviors comprised of data acquisition and analysis (T-MONITOR, T-EXTERNAL), networking with professionals outside of the department (T-EXTERNAL), and planning responses to various internal and external factors could impact their department (T-PLAN). These activities, in general, do not align well with the four change agent roles as described by Havelock and Zlotolow (1995), but they do seem to congeal around department chairs playing the roles of independent “researcher” as they collected and analyzed internal and external data, and “strategizer” as they planned how to work with the information they learned from their research.

No discernable differences were identified between successful and unsuccessful cases of change during the CARE stage. Figure 7 shows the results of content analysis of behaviors reported by department chairs during their CARE stage. Department chair references to different leadership behaviors were then plotted on The Leadership Grid, shown in Figure 8; circles were placed based on the interpretation of the behaviors described, the size of the circle indicates the number of times a particular behavior was mentioned, and unsuccessful cases are represented by a heavily outlined circle. Figure 9 shows a further analysis of leadership behaviors coded from descriptions of successful changes during the CARE stage; task-related behaviors are illustrated in blue, people-

related behaviors are illustrated in pink. These figures represent only a general count of behaviors mentioned by department chairs, and not the duration or valence of the behavior; however, these visual representations mirror the descriptions of leadership behaviors described during the CARE stage and therefore permit a visceral understanding of the stage as reported by department chairs.

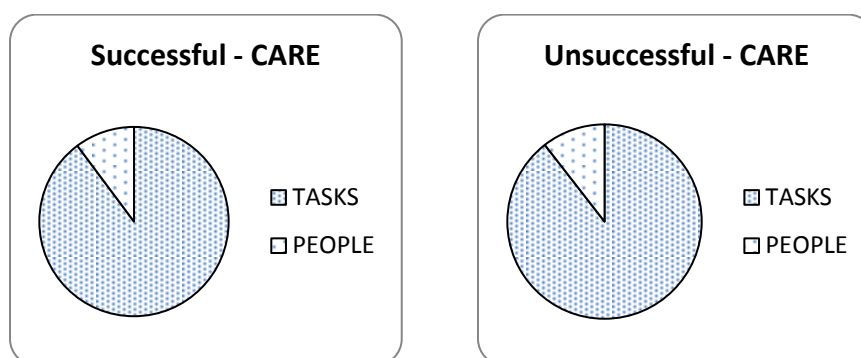


Figure 7. Task vs. People-focused Leadership Behaviors Identified in the CARE Stage

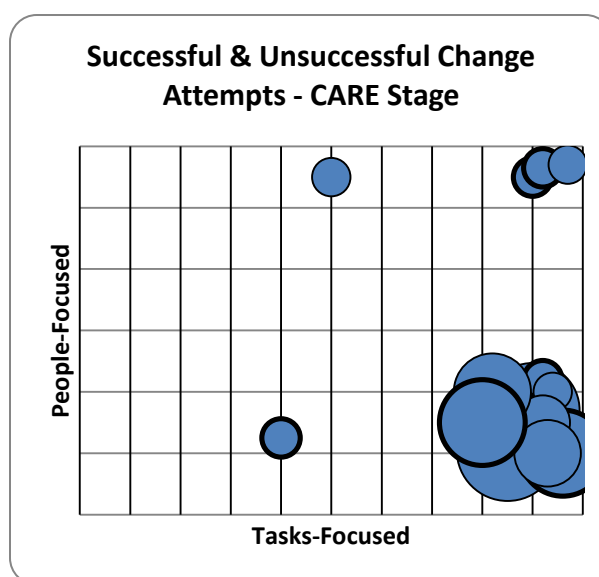


Figure 8. Leadership Behaviors Plotted on the Leadership Grid during the CARE Stage

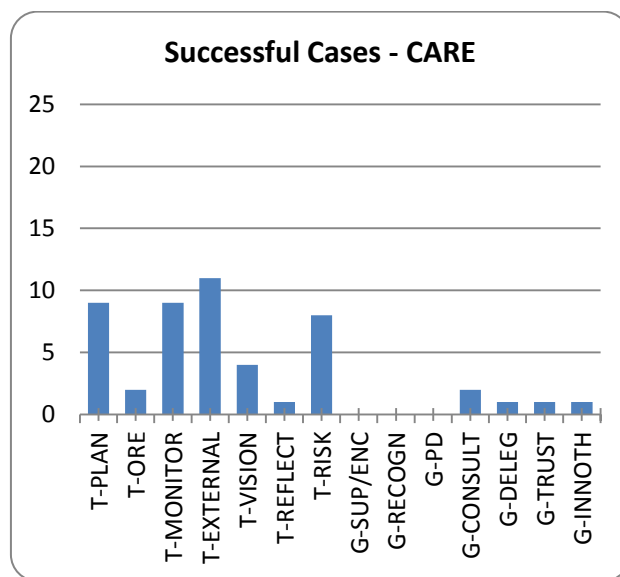


Figure 9. Specific Leadership Behaviors Identified during the CARE Stage of Successful Instances of Change

As this research further explored the behaviors of department chairs during different stages of the CREATER cycle of change, the RELATE stage emerged as less of a stage within a progressive set of steps and more of an underlying foundation from which department chairs operated. During the RELATE stage, department chairs worked to gain the respect and trust (G-TRUST) of their teachers by demonstrating expertise, understanding the dynamics of the department (T-MONITOR), providing structure that promoted an efficient work space for teachers (T-PLAN), showing recognition for teachers' work, encouraging teachers in their growth (G-REC/ENC), and trusting teachers' abilities to creatively conduct themselves as professionals (G-DELEGATE, G-INNOTH). While the RELATE foundation was being established or reinforced through the gaining of trust, other stages of the change process examined by this study progressed sequentially. During the RELATE stage, department chairs exemplified Ely's (1990)

condition of change of leadership through their modeling of professional, expert, supportive, and trustworthy behavior. None of the four change agent roles described by Havelock and Zlotolow (1995) captures the roles department chairs played while engaging in behaviors that correspond to this stage; however, these actions set the stage for department chairs to be taken seriously as they morph into other leadership roles such as the catalyst, solution-giver, process-helper, or resource-linker. In this stage, as described by the department chairs in this study, department chairs appear to exemplify the roles of a “knowledge-holder,” “supporter,” and “guide.”

Leadership skills mentioned as department chairs developed relationships consisted of tasks-related behaviors such as planning short-term activities (T-PLAN), monitoring the operations and performances of the department (T-MONITOR), and reflecting on leadership practices (T-REFLECT), as well as people-focused behaviors such as building trust through modeling, conversations, and actions (G-TRUST), providing support and encouragement (G-SUP/ENC), professional development (G-PD), and consulting with department members (G-CONSULT). This wide-range of department chair leadership behaviors indicates that department chairs understood that their ability to build relationships with their teachers relied, in large part, in their ability to demonstrate their ability to do their job as department chair. Compared to other stages of the change process, RELATE appeared to take the most time to mature, and the people-focused behavior of building trust (G-TRUST) was most prominent in this stage. These combined factors of trust and time were summarized by a department chair who stated:

It's taken a few years for them to see that I'm not here to make them look bad or do something they don't want to do, but we have to move in a different direction because this isn't good enough yet.

In all stories of change, department chairs relied on their expertise and professionalism to gain the trust of teachers; however, this expertise seems to have been almost exclusively used to help teachers and provide insight into education, and not to impose ideas or control others. One department chair emphasized this important display of department chair competence by saying, "Teachers won't have to flounder because the department chair knows how to do this." This also indicates that department chairs understand that part of their job is to make the work of their teachers more effective and efficient through their ability to intervene with extraneous factors.

Department chair use of task-focused behaviors to help but not control teachers is reflected not only in the stories reported by department chairs, but also in their LSI scores: Most department chairs in this study scored in the bottom half of LSI participants nation-wide on their Power scale, which measures a person's tendency to associate their self-worth with their ability to control situations and dominate people (LSI, 2011). This parallels the descriptions within department chair interviews that although task-focused behaviors established trust in their leadership abilities, department chairs did not rely on power to control teacher behaviors; collaboration between teachers and the department chair was achieved through respect, not coercion.

Department chairs within this study held most of their teachers in high regard, and therefore felt comfortable consulting with and delegating to teachers within established guiding structures. Department chairs used task-focused behaviors to guide

and organize teachers, as well as to reflect on their leadership and their fields; their trust in teachers and their understanding of the challenges of the teaching profession was displayed in people-focused behaviors, such as consultation, delegation, recognition, and encouragement. These department chair actions seem to match with roles that could be described as “guide” and “supporter,” both of which increase the trust of teachers in their department chair, and therefore lend capital to the department chair for when they attempt to take on other leadership roles within the change process.

The combination of task- and people-focused behaviors described in department chair stories of change is also reflected on their LSI Humanistic-Encouraging scale: Most department chairs scored in the top half of all LSI participants nation-wide, which indicates they value being able to provide a supportive environment that encourages the development of people to reach their full potential in the pursuit of organization goals (LSI, 2011). This scale score in particular indicates a balance between tasks and relational leadership behaviors, which is evident in department chair stories during this stage of the change process. One department chair summarized the tasks versus people balance of the RELATE stage, as well as the roles of “guide” and “supporter,” when she said:

I’m a shepherd. I get the sheep together, going in the same direction. I take care of the sheep. The shepherd puts themselves out in front of the sheep, makes sure that the sheep have everything they need. Teachers need support, they need you to listen.

Beyond the generalized categories of task- and people-focused leadership behaviors, department chairs also reported specific leadership actions that helped them

build relationships with members of their departments. These behaviors, which embody Ely's (1990) condition of leadership, included having a visible presence, modeling behaviors, expressing an overarching vision, expressing appreciation for teachers' work, and, in four cases, continuing to teach classes. Many of these activities match with the leadership roles of "supporter" and "role model." One department chair reported that when he first took his chair position, a respected colleague gave him advice: "She pretty much told me I needed to be available to my teachers." Another department chair provided both structure and encouragement through his presence at team meetings: "I rotate to different late start meetings... if a team is struggling, I'll stay with them for more of the days."

To ensure a presence and one-to-one connections, most department chairs reported that they not only served as a "supporter" in their quest to build relationships with their teachers, but that they also served as a "guide." Most department chairs in this study meet with their teachers two or three times a year: "I meet with them and set teaching goals at the start of the year and check in on how things are going at midterm and at the end of the year." Other meetings were more casual, or occurred on an as-needed basis: "I did a lot of individual conversations." This again represents the presence of Ely's (1990) condition of leadership.

Combining department chair presence and modeling, one department chair shared, "I went to workshops with teachers who struggled with the change. Some didn't want to go, but I said, 'Listen, I'm busy too, but I see value in this so give it a shot.'" One department chair shared that as she encouraged teachers to try new teaching

techniques: “I try to be really supportive, and I thank them for a lot of things. When they try things in the classroom, I tell them I appreciate it. It might be a personal note, or an email.” Another department chair said “I’m still in the trenches, I try things our first before I ask teachers to do it; I am a classroom teacher.”

No substantial differences were found between the behaviors of departments chairs during the RELATE stage in successful versus unsuccessful instances of change. Figure 10 demonstrates the similarities between the division of task- and people-focused behaviors in successful and unsuccessful cases. These charts were created by tabulating the number of times different leadership behaviors were mentioned in department chair reports that correspond to the RELATE stage of the CREATER model. Department chair references to different leadership behaviors during this stage were then plotted on The Leadership Grid, shown in Figure 11; circles were placed based on the interpretation of the behaviors described, the size of the circle indicates the number of times a particular behavior was mentioned, and unsuccessful cases are represented by a heavily outlined circle. Figure 12 further displays different categories of leadership behaviors expressed in successful cases of change. These visual representations only capture the number of times department chair indicate specific behaviors in their stories; they do not capture the duration or the valance of the behaviors mentioned. Despite the limitation to these illustrations, the overall trends displayed in the graphs, such as the emphasis on building trust during this stage, mirror the trends that emerged from department chair stories, and therefore provide an additional mode for understanding the phenomenon recounted by department chairs of their experiences during the RELATE stage.

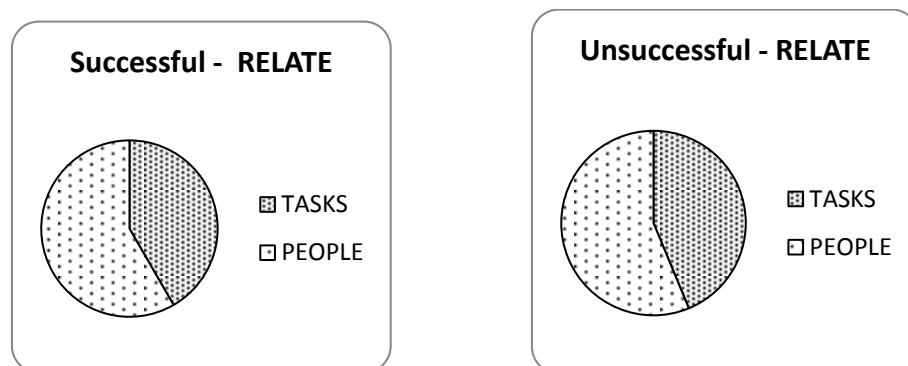


Figure 10. Task vs. People-focused Leadership Behaviors Identified in the RELATE Stage

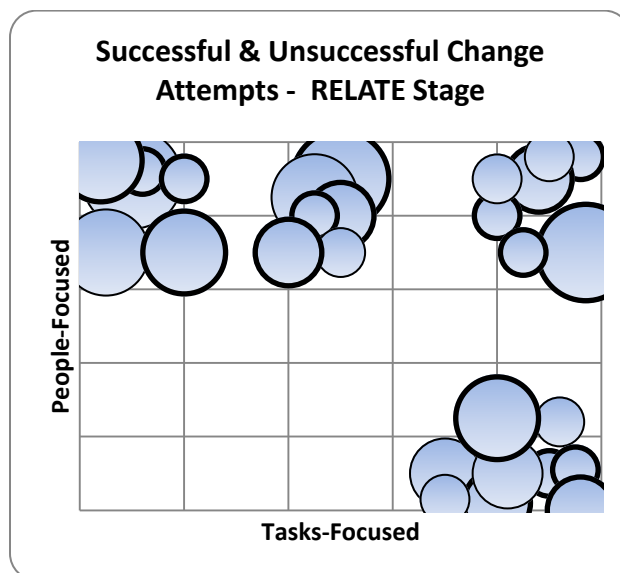


Figure 11. Leadership Behaviors Plotted on the Leadership Grid during the RELATE Stage

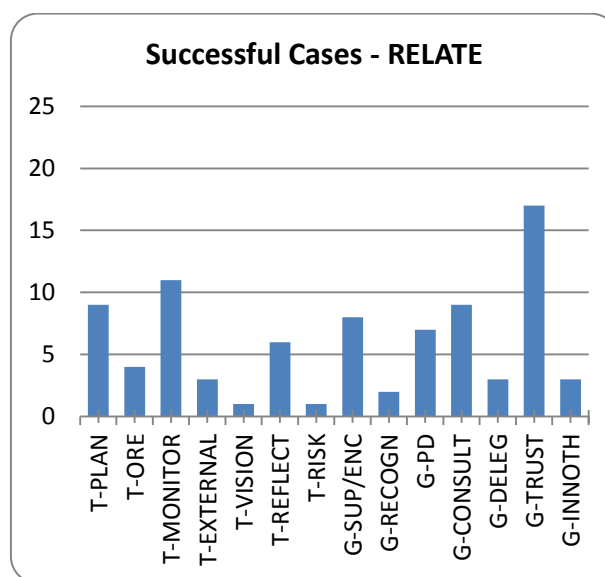


Figure 12. Specific Leadership Behaviors Identified during the RELATE Stage of Successful Instances of Change

Once department chairs identified issues or areas that would benefit from changes during the CARE stage, and as they continued to build relationships, they shifted from internal thought-based processes to strategically involving teachers during the EXAMINE stage of the change process. This matches change literature descriptions of this stage as a time when leaders continue to analyze situations and explore issues uncovered during the CARE stage (Havelock & Zlotolow, 1995). Stories of change within this research revealed that department chairs maintained a level of control over the change process during this stage by establishing structures in which teachers were consulted: Department chairs set meeting times and agendas, decided which data, discussion questions and research articles would be shared, and established role expectations and objectives (T-PLAN, T-EXTERNAL, T-MONITOR, T-ORE). Within this framework, department chairs guided and reacted to department conversations while

receiving feedback from teachers (G-CONSULT). This feedback and teacher responses provided department chairs with a fuller view of barriers compared to the view available to them in the CARE stage and allowed them to plan accordingly. While leadership behaviors evident in the stories of department chairs during the EXAMINE stage included a level of task-focused behaviors, the people-focused behavior of consultation with teachers emerged as the most prominent single leadership activity.

The EXAMINE stage in both successful and unsuccessful stories of change were similar in their focus on tasks- and people-oriented leadership behaviors; however, department chair stories of successful instances of change contained more descriptions of clarifying objectives and role expectations (T-ORE) and consulting (G-CONSULT) behaviors. These behaviors represent department chairs playing the role of “catalysts” and “process-helpers” as described by Havelock and Zlotolow (1995). Department chairs worked as catalysts when they presented information to their teachers in the hopes of prompting teachers to view change as desirable; department chairs worked as process-helpers as they arranged meetings and activities designed to lead teachers through change process decisions.

Additional differences between successful and unsuccessful change attempt stories were also observed in this stage, although these differences were not always recognized by department chairs at the time. From analyzing and interpreting these cases, it seems that department chairs who led successful cases carefully listened to the feedback they received from teachers during the EXAMINE stage and waited until teachers were on-board with the idea of change before they progressed to the next stage

of the change process. In addition, it appears that department chairs can soften the blow of having started a doomed change initiative by recognizing and responding to teacher feedback respectfully and professionally during this stage.

In one story of unsuccessful change, the department chair was unable to discern that a change was failing during the EXAMINE stage because an administrative mandate forced his department to completely skip this stage, effectively removing teachers from the decision-making process and forcing them to move directly into the TRY stage. This resulted in disenfranchised teachers who lacked an understanding of the change, and therefore lacked investment in the process. This department chair had little ability to enhance this change process through his leadership behaviors due to his administration's fast-paced press for the change; this pace also stymied his ability to play the role of catalyst because the change had already been decided upon, as well as his ability to play process-helper because the process was forced and underway. In addition, because his administration expected him to begin this change during the first months on the job, it forced him to instigate a change before he had established relationships and trust with his teachers.

Two other unsuccessful stories of change experienced the EXAMINE stage, but the department chairs overlooked signs that the change attempt was in jeopardy. This misreading of the context occurred when most of the teachers in the department were satisfied with the decisions that resulted from the EXAMINE stage, but a small segment of teachers were not. One department chair was unaware of this dissatisfied segment of teachers and assumed that they also agreed to contribute to the change. However, as the

TRY stage began, this group of teachers eventually expressed their displeasure, bringing the change attempt to an end. In the other case, the department chair also continued to move the department to the TRY stage, hoping that resistant teachers would eventually warm up to the change idea. These teachers currently comprised a part of the change is still struggling, and the department chair has returned this group of teachers to the EXAMINE stage, with reinforcements, for another attempt at change. These two examples of unsuccessful change indicate that these two department chairs failed in their catalysts roles: They did not provide a strong enough logic to move teachers to feel dissatisfied by the status quo, and therefore, they rejected the change, resulting in damaged relationships and hard feelings.

The final story of unsuccessful change is the only example of an unsuccessful change that ended with relatively little damage. The difference between this unsuccessful change and the other three is that this department chair paid close attention to teachers' feedback and recognized during the EXAMINE stage that her teachers didn't see the importance of the change. Although the department chair felt that the change was worthwhile, she felt that it wasn't immediately necessary, and realized that teachers were not moving towards being dissatisfied with the status quo. She was sensitive to teachers feeling overwhelmed with other aspects of the teaching year, so she tabled the examination of the change for a later, more conducive date. Her actions during this time indicated that she failed as a catalyst, but she was able to play the role of process-helper, and this contributed to her ability to build relationships with her teachers. She shared her thinking at this time:

Eventually, I was like, you know what? I think we're just not going to worry about this right now...we're trying to do all this other stuff, so we don't need to layer this on. I can live with this. It did raise awareness, and I do want to revisit it later on.

Similar to unsuccessful instances of change, successful instances of change were comprised of structured activities, research, and consultation during the EXAMINE stage. Department chairs played the role of “catalyst” by sharing internal (T-MONITOR) and external (T-EXTERNAL) data with their teachers, trusting that teachers would identify issues and innovate solutions: “They were true scientists, they believe in data.” Department chairs also played the role of “solution-givers” by posing provocative suggestions masked as questions (G-CONSULT), such as “Couldn't we do more with our labs?,” “If it's the best thing for kids, they why aren't we doing this?,” and “Isn't common grading a solution?” From there teachers provided input and suggestions through department discussions and written responses based on the department chairs' professional focus and vision (T-VISION): “Discussions centered on what is best for students.”

Documents provided by department chairs representing the activities and thoughts processes during this stage reflect a high level of communication, discussion, analysis, and brainstorming with teachers. These documents indicated a combination of task- and people-focused leadership behaviors that not only provided feedback in the form of monitoring internal processes and gathering teacher ideas (T-MONITOR), but also involved teachers in the decision-making process (G-CONSULT). Some of these documents, such as articles and department data, represent department chairs playing the

role of “catalyst” or subtle “solution-giver,” but others centered on organizing activities, which indicate department chairs playing the role of “process helpers.”

In general, despite the fact that the EXAMINE stage presented the identifying clues of divergence between successful and unsuccessful change attempts, most leadership behaviors were the same between successful and unsuccessful cases during this stage; department chairs that experienced this stage provided information, guidance, and structure to their departments (T-MONITOR, T-PLAN, T-EXTERNAL) and asked teachers to examine the situation and brainstorm solutions (G-CONSULT) or innovations (G-INNOTH). However, of all the leadership behaviors described in department chair stories, consulting was expressed in stories of successful change more often than in stories of unsuccessful change.

Additionally, in this stage, three of the four change agent roles as described by Havelock and Zlotolow (1995) were evident. This indicates a special importance of this stage, as well as the need for department chairs to be prepared and strategic as they enter this stage. In most cases, department chairs played the role of process-helper through their work organizing situations that conduced to change, catalyst as they set the stage with information related to the change they hoped to attempt, and solution-giver through their subtle use of suggestions and questions that were designed to provide ideas as to how a change might be focused.

Figure 13 shows a view of how often department chairs mentioned task- and people-focused leadership behaviors in their stories of successful and unsuccessful change during the EXAMINE stage. These illustrations reflect department chair stories:

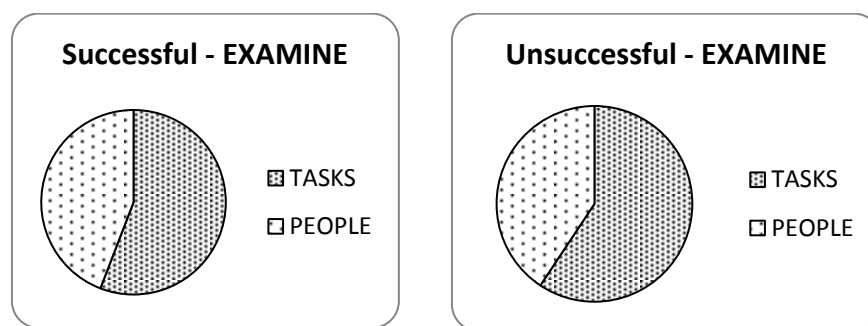


Figure 13. Task vs. People-focused Leadership Behaviors Identified in the EXAMINE Stage

There is very little difference in department chair behaviors in successful and unsuccessful instances of change. This is further illustrated in Figure 14, which shows statements of different leadership behaviors transferred onto The Leadership Grid; circles were placed based on the interpretation of the behaviors described, the size of the circle indicates the number of times a particular behavior was mentioned, and unsuccessful cases are represented by a heavily outlined circle. Although the division between task- and people-related leadership behaviors are similar, the EXAMINE stage is the first stage in which unsuccessful change story trajectories begin to separate from the successful cases of change. Figure 15 shows a more complete disaggregation of leadership behaviors mentioned in successful stories of change as told by department chairs in this study, illustrating the importance of consultation with teachers on the decision to attempt a change.

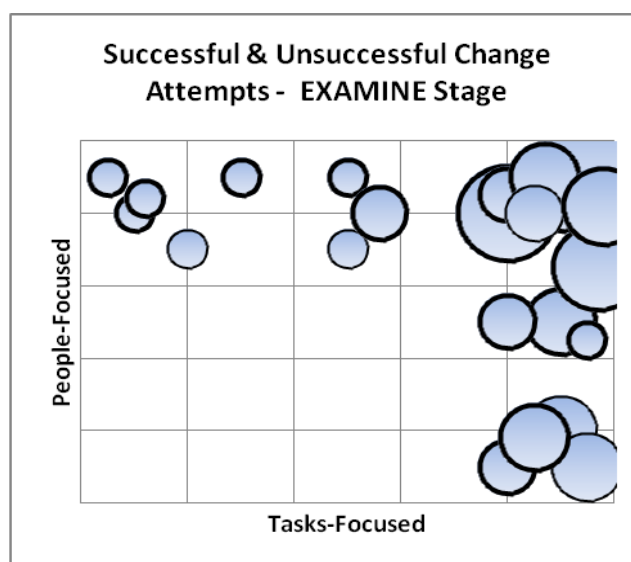


Figure 14. Leadership Behaviors Plotted on the Leadership Grid during the EXAMINE Stage

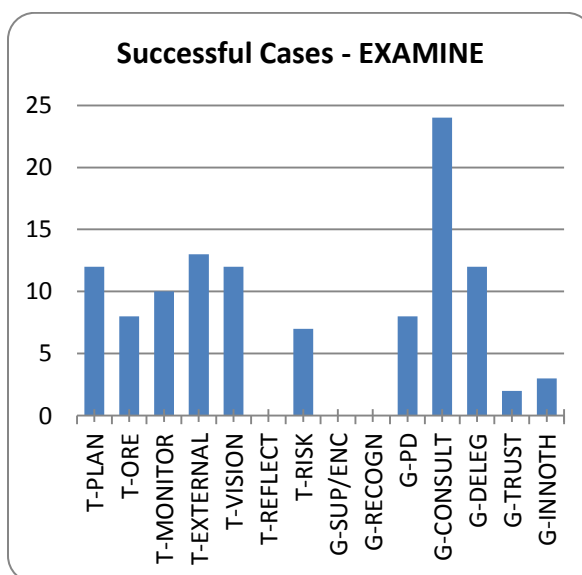


Figure 15. Specific Leadership Behaviors Identified during the EXAMINE Stage of Successful Instances of Change

The subsequent TRY stage is described as a time when leaders test the feasibility of the proposed change and make adjustments to the change in order to better fit the

needs of the system (Havelock & Zlotolow, 1995). For the department chairs in this study, this stage was a time in which they constructed or enhanced team structures (T-PLAN), set objectives and expectations (T-ORE), and delegated to teachers to innovate details of the change (G-DELEGATE, G-INNOTH). This represents a further reallocation of process control from department chair to teachers. During this stage, department chairs viewed themselves as guides and supporting players for teachers to access as needed; they most frequently played the role of the process-helper, letting teachers determine the details of the change. Department chairs continued to monitor the progress of teams (T-MONITOR), but their involvement in the innovation was reduced. While there are moderate levels of task-focused behaviors in the TRY stage, the people-behavior of delegation to teachers (G-DELEGATE) is the most prominent single leadership behavior.

Based on the stories of change within this study, the TRY and ACQUIRE stages were combined for this project. In most cases, the ACQUIRE stage was either not part of change stories, or it was mentioned in conjunction with the TRY stage. This might be due to the special conditions found within secondary school: In most cases, departments have the equipment, time, and budget they have, and unless there is a large amount of effort or need, those resources are not going to change much.

By the time department chairs and teachers entered the TRY stage, the basic idea of the change or innovation had been determined; teachers entered the TRY stage to flesh out the details of the change and its implementation. Occasionally a pilot of the change was completed during this stage. During this stage, department chairs played the role of

change process-helpers by focusing on planning activities, setting objectives, and monitoring progress (T-PLAN, T-ORE, T-MONITOR); however, the responsibility for determining the details of the change and pursuing innovative thinking were delegated to teachers (G-INNOTH, G-DELEGATE). This balance of task- and people-focused leadership behaviors provided the structure, guidance, and encouragement that helped teachers use their creativity and professional knowledge to design the change in the way they thought best for their department and students. Delegation within a structured environment is the major characteristic of this stage within the stories of these department chairs.

In the TRY stage, DC1 delegated the construction of common assessments to the freshman team; as the process-helper, she arranged time for teachers to work as a team, then helped them compile their work (T-PLAN). Teachers were instructed to set goals for their project, and provided with time to construct their exams and determine how these common assessment results would be used by the team (T-ORE, G-DELEGATE). These teachers also received training on the data management system that would help them with their analysis (G-PD).

DC4 also worked on common assessments with a small starter team of teachers who began using only a few common questions. During their TRY stage, the department chair acted as a process-helper by arranging time and space for teachers to work (T-PLAN) as they determined questions and procedures for sharing and editing questions (T-ORE, G-DELEGATE). This department chair recognized her expertise and support might be needed (G-SUP/ENC), so she set her schedule so she could be available during

these activities, “My presence demonstrated my own time commitment and provided support and encouragement without controlling their work.” During this stage, DC4 also allowed teachers to explore and make mistakes because “they have to have some kind of ownership over some part of it. If they don’t have ownership... then they’re not going to buy in.”

DC2, DC5, DC7, and DC8 followed a similar pattern as process-helpers by providing time to a team of teachers to design a new course or enhance their current courses. In some of these cases, pilots of new courses were permitted, and in other cases, teachers visited other schools as they worked to design their new course (T-EXTERNAL). As in all successful instances change, the department chair set broad objectives (T-ORE) and provided time, structure (T-PLAN), support, and encouragement (G-SUP/ENC); upon that provided structured and supportive foundation, teachers were encouraged to use their creativity and knowledge to complete the organization and initiation of the change (G-DELEGATE, G-INNOTH).

Two of the four unsuccessful changes explored in this study progressed past the EXAMINE stage to the TRY stage. Neither of these change attempts successfully emerged from this stage; however, one of these change attempts has returned to the EXAMINE stage with added resources, and the other failed change attempt may be resurrected in the future. The change attempt that is continuing began the TRY stage with teachers who were resistant to the change, so their ability to create details that build upon the change chosen in the EXAMINE stage was fruitless. Multiple meetings were structured for this team during the TRY stage that resulted in no change progress. Based

on this lack of movement, and despite the continued support and structure, the department chair decided to involve the assistant principal as they re-entered the EXAMINE stage to provide a more explicit directive for change:

Last year was just a lot of listening and hearing this, but this year I brought in the principal to help co-facilitate the meeting. I said to them, ‘Last year I tried my darndest to get them to realize that what they're doing isn't quite enough.’

The other unsuccessful change attempt that made it to the TRY stage that has presently ended appears to have suffered from a lack of Ely’s (1990) condition for change, leadership. The origin of this leadership deficit does not reside within the department chair of this study, however; it resides within the context of the change. Factors that contributed to the dilution of this department chair’s leadership included the opening of a new campus which not only physically separated teachers, but also added secondary leaders at the other campus that permitted teacher resistance to take hold:

The leader at the other campus listened and did good interpersonal stuff, but didn’t focus on getting the job done that we had agreed to. I was going on, getting things done, had this in my mind, but other people had stopped thinking about it. It was in my head, but not there for the whole group.

Although the first hints of an unsuccessful change attempt were retrospectively observable in the EXAMINE stage via teacher feedback, two of the four unsuccessful cases continued into the TRY stage, then ended. This seemingly “surprise ending” generated some hurt feelings in both the department chair and teachers. Due to the falling out of these unsuccessful cases, only successful cases are addressed in the graphs depicting leadership behaviors mentioned in department chair stories during the TRY

stage. Figure 16 displays the number of times a department chair mentioned a task- or people-focused leadership behavior during the TRY stage of successful cases. These descriptions were then plotted onto The Leadership Grid in Figure 17; circles were placed based on the interpretation of the behaviors described, the size of the circle indicates the number of times a particular behavior was mentioned, and unsuccessful cases are represented by a heavily outlined circle. Figure 18 breaks these behaviors down into their subcategories. These illustrations reflect the stories of the department chairs although the valence of these behaviors are not depicted in these graphs. However, these illustrations do provide a snapshot of trends reported by department chairs in their stories of change during the TRY stage.



Figure 16. Task vs. People-focused Leadership Behaviors Identified in the TRY Stage

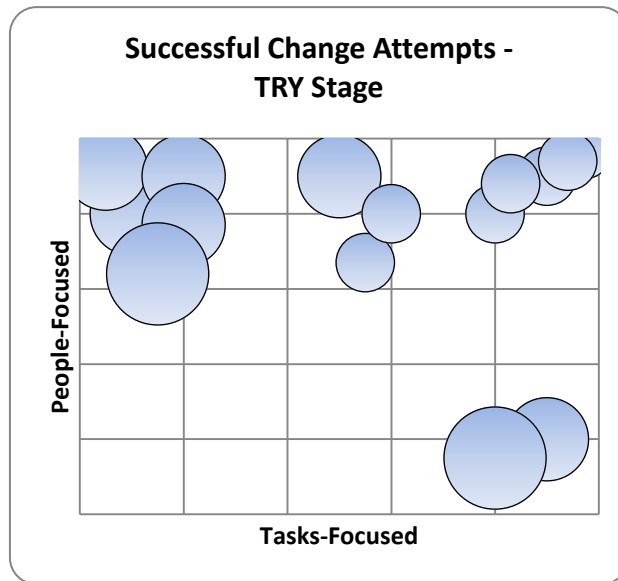


Figure 17. Leadership Behaviors Plotted on the Leadership Grid during the TRY Stage

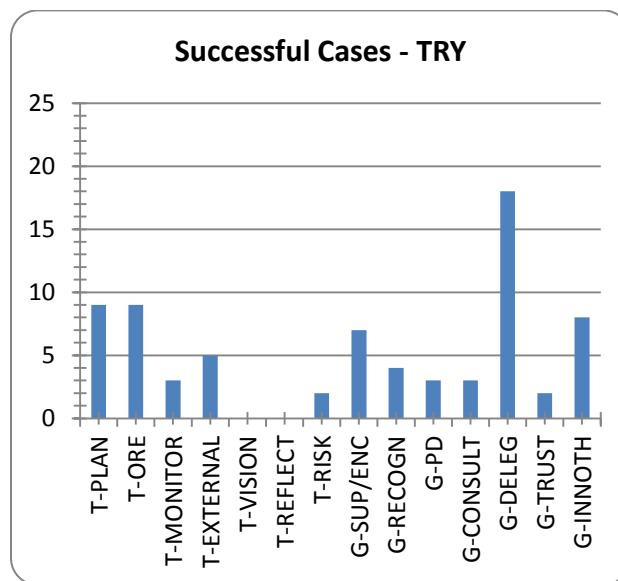


Figure 18. Specific Leadership Behaviors Identified during the TRY Stage of Successful Instances of Change

The EXTEND stage is described as a time in which the change initiative spreads from a small area of influence to others areas of possible impact (Havelock & Zlotolow, 1995). In the stories shared by department chairs about their experience with change, this stage appears to be a time when department chairs acted as process-helpers by continuing to monitor progress and provide guidance, but allowing teachers determine whether the change will expand in size or into other areas. A common leadership activity department chairs reported in this stage of the change process was organizing activities in which the data resulting from the change would be shared by the teachers who were participating in the change (T-PLAN, T-MONITOR). One department chair characterized this stage by sharing the observation that, “Some teams were continuing with their progress on the initiative, other teams were just beginning.” In the cases examined by this study, department chairs monitored the change results, provided a venue to share this information, then asked teachers determine if and how this change should be expanded. Again, in this stage, a basic level of task-focused leadership behaviors was reported as a way to continue the supportive structure and guidance of teachers. This was accompanied by a maintenance of general people-focused leadership behaviors, with the peak leadership behavior emerging as delegation (G-DELEGATE) which allowed teachers to determine the next course of action (G-INNOTH).

In DC1’s situation, the initial team of freshmen teachers who implemented common assessments shared their success with other members of the department (G-REC, G-PD) who were then inspired to attempt the change within their content area as well. In DC2’s case, teachers continued to refine and align their curriculum throughout

the course progression strand (G-DELEGATE, G-INNOTH) during this stage. And, in DC4's story of change, teachers began their change to common assessments with only a few questions, but,

That's what we did the first year, and now teacher have said 'Can we go back and make all of our test a common test and not just partial?' So they see the value in it. And I said to them if that's the choice you want to make, then we'll do that, so now they can go into their teams and follow up with that (G-DELEGATE).

DC7 was able to collect data (T-MONITOR) to demonstrate to administration and parents the benefits of their new course, and based on this success, the department was able to offer their new freshman course to more students. These teachers also shared their experiences with other schools in the area (G-REC) and continued to adjust their vertical alignment of courses (G-DELEGATE): "Teachers are now sharing their experiences and what students are doing in their classrooms so there is more alignment of skills in upper classes."

Finally, DC8's teachers who worked to enhance their course curriculum with inquiry presented their lessons to their school board, shared their lessons and laboratory activities with other teachers in their department, and tried new approaches to teaching their content (G-REC, G-INNOTH). This department chair's hope was that resistant teachers would see the success of this group of teachers and become inspired to take some risks within their teaching approaches, "One of my goals that we've done is to increase show-and-tell during department meetings. I didn't set it up very well, but now it's working better."

In general, department chair leadership during the EXTEND stage is marked by leadership behaviors that sets the stage for successful data to be shared (T-PLAN) and for teachers involved to continue their work on their innovations (G-DELEGATE, G-INNOTH) and receive recognition for their role in implementation of the change (G-REC). This matches with Havelock and Zlotolow's (1995) change agent role of process-helper. Figure 19 shows the balance between the instances when department chairs mentioned task- and people-focused leadership behaviors during the EXTEND stage of the change process. These descriptions were then plotted onto The Leadership Grid in Figure 20; circles were placed based on the interpretation of the behaviors described and the size of the circle indicates the number of times a particular behavior was mentioned. Figure 21 shows a further exploration of which specific behaviors were mentioned in department chair reports, especially the task-focused planning (T-PLAN), and the people-focused delegation (G-DELEGATE) and encouragement of innovative thinking (G-INNOTH) behaviors. Although these graphic depictions only represent the number of times a department chair stated a classifiable leadership behavior and does not represent the time duration or the valence of the behavior, they do reflect the stories of the department chairs. These illustrations provide a surface-level view of the overall characteristics of the behaviors of department chairs of this study during the EXTEND stage of the change process.

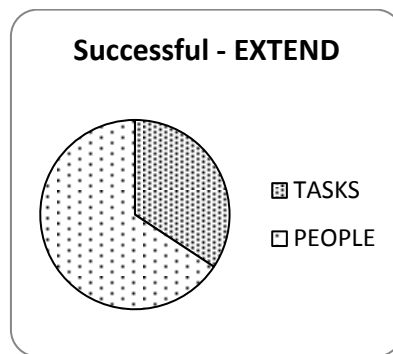


Figure 19. Task vs. People-focused Leadership Behaviors Identified in the EXTEND Stage

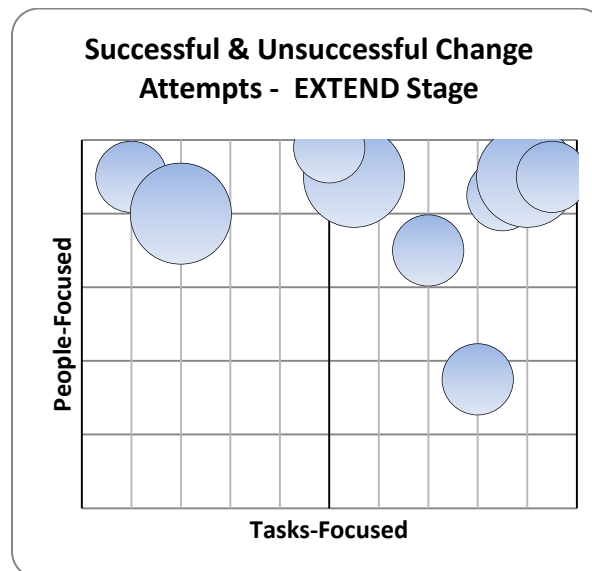


Figure 20. Leadership Behaviors Plotted on the Leadership Grid during the EXTEND Stage

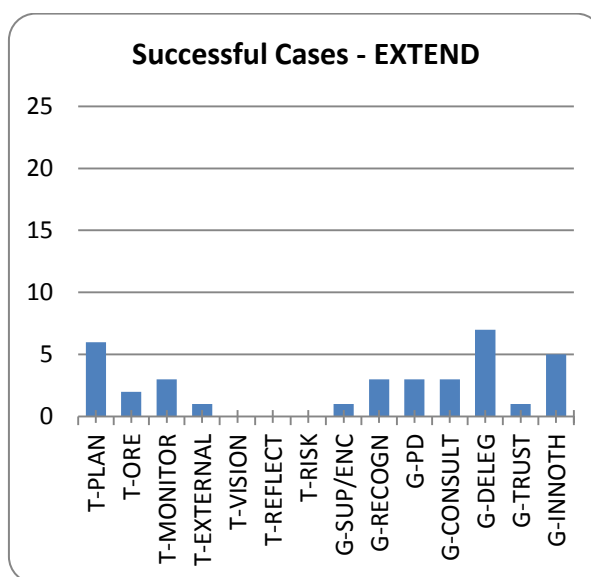


Figure 21. Specific Leadership Behaviors Identified during the EXTEND Stage of Successful Instances of Change

The final stage of the CREATER cycle is RENEW. During this stage, the change is more fully evaluated and the continuation of change establishment is nurtured (Havelock & Zlotolow, 1995). In this stage, department chairs appear to play a similar role as that seen in the CARE stage, but with a more localized focus: Department chairs played the role of “researcher” focusing almost solely on change impact and “strategizer” on how to communicate the outcome of the change and how to encourage future change enhancements. In these stories of department chairs leading change in science departments, a slight shift back toward task-oriented leadership behaviors was reported. While the department chairs continued to delegate to (G-DELEGATE) and consult with (G-CONSULT) teachers at a high level, their monitoring of data and processes (T-MONITOR) increased. As teachers and department chairs evaluated the impact of the

change, they often remained restrained, yet hopeful, in their analysis. One department chair shared her thinking at the time as:

We had time at the beginning of the year to work on this and see how things are going. We're open to changes. We realize we don't have it all figured out, we need to see what the impact is.

Another department chair described documents of meeting notes by explaining that, "This meeting after our first year reviewed the progress and our student surveys, and focused on making year two stronger." Although teachers are still heavily involved during the RENEW stage, department chairs tended to increase their involvement in the change process through task-focused behaviors such as monitoring data and change process progress, as well as through people-focused behaviors such as recognition and encouragement of teachers' change efforts. Department chair action during this stage provided structure for teachers to view their accomplishments, as well as a foundation and spirit to continue their work.

Interestingly, this stage did not garner as much discussion during department chair interviews, even with further questioning; however, responses related to this stage are similar between cases, and are characterized in department chair stories of successful changes by a balance of department chair leadership behaviors focused on tasks and leadership behaviors focused on people. Department chairs in this study shared data gather from their researcher activities with their teachers without much flourish, and then let teachers draw their own conclusions; this approach permitted celebratory energy to build on its own among teachers. One department chair recounted a data sharing session with her teachers:

I'll never forget the first time I showed that and the teachers were aghast, they were like, 'Really? Really?' And they were joking, asking me, did you manipulate that data? For real, I didn't. This isn't me, this is your data.

One department chair recognized the internal rewards of positive data resulting from a change, "I feel like we're at the point where people can be proud of some of the things that they're doing." Another department chair stated, he doesn't have to prompt teachers to continue their work on this change, "They want more grants, they want to re-examine and restructure. It kind of has its own life."

Figure 22 shows the balance between the times department chairs mentioned leadership behaviors that focus on tasks and people during this stage of the change process. This data was then transferred onto The Leadership Grid in Figure 23; circles were placed based on the interpretation of the behaviors described and the size of the circle indicates the number of times a particular behavior was mentioned.. Figure 24 presents a further examination of the specific behaviors mentioned in department chair stories during the RENEW stage. These illustrations reveal the number of times department chairs mentioned certain leadership behaviors, without regard to duration or valence; however, these graphs mirror department chair descriptions of their experiences during the RENEW stage of the change process, and therefore provide a general overview of the leadership behaviors present in their stories during this stage. In concert with department chair stories, these graphs indicate that the RENEW stage is characterized by data collection (T-MONITOR), and a mix of consultation, delegation,

and an encouragement of innovative thinking (G-CONSULT, G-DELEGATE, G-INNOTH).

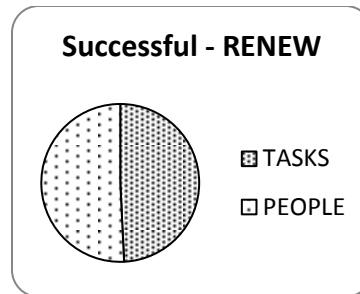


Figure 22. Task vs. People-focused Leadership Behaviors Identified in the RENEW Stage

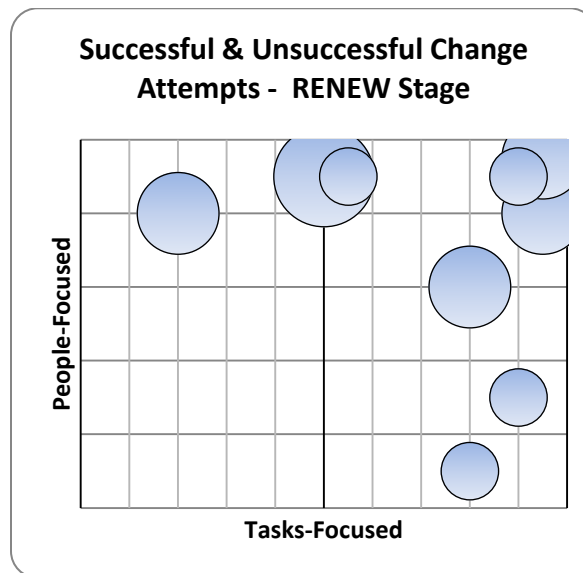


Figure 23. Leadership Behaviors Plotted on the Leadership Grid during the RENEW Stage

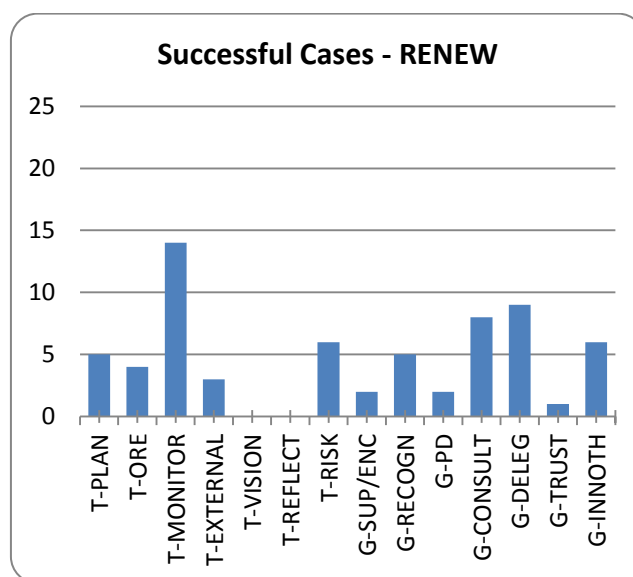


Figure 24. Specific Leadership Behaviors Identified during the RENEW Stage of Successful Instances of Change

The topic addressed by Research Question 4 of this study related to how department chairs described their experiences and roles as leaders during stages of the change process. Department chair stories in this research indicate that similar leadership behaviors are used in the beginning stages of the change process for both successful and unsuccessful change initiatives. In the CARE stage, department chairs focused on behind-the-scenes, task-related leadership behaviors. These behaviors allowed department chairs to understand the context in which their department operated and strategize how to approach teachers with the ideas of change. The main roles department chairs seemed to play in the CARE stage was that of independent “researcher” and “strategizer.” In the RELATE stage, which emerged in this study as more of a continually built and reinforced foundation than a stage, department chairs focused on gaining the trust of their teachers by demonstrating expertise, as well as listening to and

involving teachers in department pursuits. In this stage, department chairs played a variety of roles, such as “knowledge-holder,” “role model,” “supporter,” and “guide.”

The divergence between successful and unsuccessful change stories within this study was first evident, retrospectively, in the EXAMINE stage. Leadership behaviors during this stage were similar in successful and unsuccessful instances of change, albeit with a slightly higher emphasis on consulting in the successful cases. In the cases within this study, department chairs often played the role of “catalyst,” “process-helper,” and occasionally, “solution-giver.” It was in this stage that department chairs correctly or incorrectly sensed teachers’ openness and willingness to commit to a change, and this had a large impact on whether the change attempt would result in success or failure. In unsuccessful change attempts, one department chair who perceived that her teachers were not buying into the change relinquished their change pursuit, while another department chair was forced to completely skip this stage due to outside pressures thereby preventing the voices of teachers to be heard, and the other two did not adequately assess teachers’ commitment to the idea of change and continued to the TRY stage prematurely.

Department chair leadership behaviors in the TRY and EXTEND stages consisted of a balance between task- and people-focused behaviors, with an emphasis on delegation and encouragement of innovative thinking within a structure provided by the department chair. In these stages, department chairs mainly played the role of “process-helper.” These leadership behaviors were also prevalent in the RENEW stage, which presented an

increased focus on department chairs monitoring of data and processes, however, department chairs returned to their roles of “researcher” and “strategizer.”

Research Question 5 of this study related to the ways department chairs altered their behaviors and strategies during stages of the change process. As department chairs described their experiences leading change, they also recounted how their leadership behaviors changed during each stage of the change process. The general progression of reported leadership behaviors in this study began with department chairs thinking and strategizing on their own, then gradually involving teachers more in the change process. Once department chairs identified possible areas of change during the CARE stage, they proceeded to the EXAMINE stage to educate teachers on the need for a change. As teachers began to invest their intellectual energies into considering and exploring different aspects of possible changes, they provided feedback and engaged in conversations. During the TRY stage, department chairs continued to promote teachers’ involvement in the process through delegation and by encouraging innovative thinking. While department chair activity was present during this stage, it was viewed primarily as a support for the work of the teachers. The final stage, RENEW, department chairs maintained high teacher involvement, but increased their guidance and structure. This stage brought closure to the first cycle of the change process. From this point, department chairs could support the development and institutionalization of the change.

Figure 25 displays a visual representation of the shifting between department chair and teacher agency during change process stages that was uncovered during the investigation of Research Question 5. Figure 26 shows this same shifting, but with

connections made to specific leadership behaviors. These graphs were based on the number and type of leadership behaviors mentioned by department chairs. The pie chart approximations associated with each stage of the change process reflect department chair stories of successful change. This visual is meant to provide a general perspective of the behaviors department chairs reported in their stories of change, and not an evaluation of the duration or valence of their leadership behaviors. The data in these graphs complement the reported descriptions of department chair behaviors during different stages of successful change attempts.

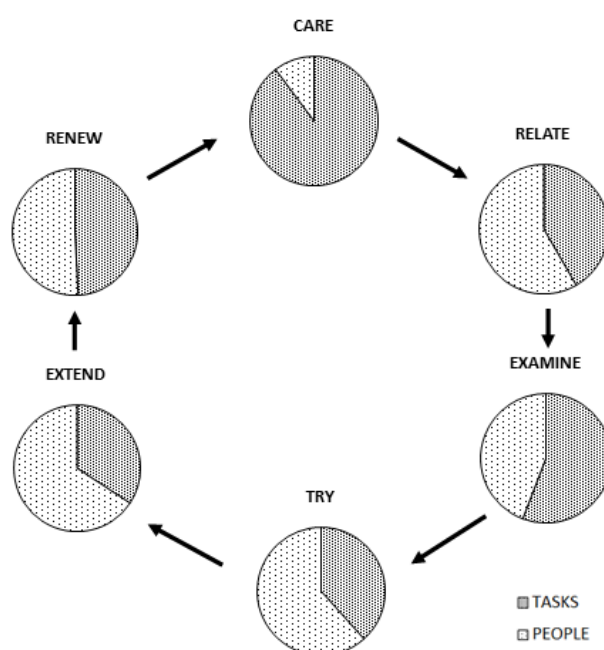


Figure 25. Leadership Foci Adjustments through Various Stages of CREATER Stages

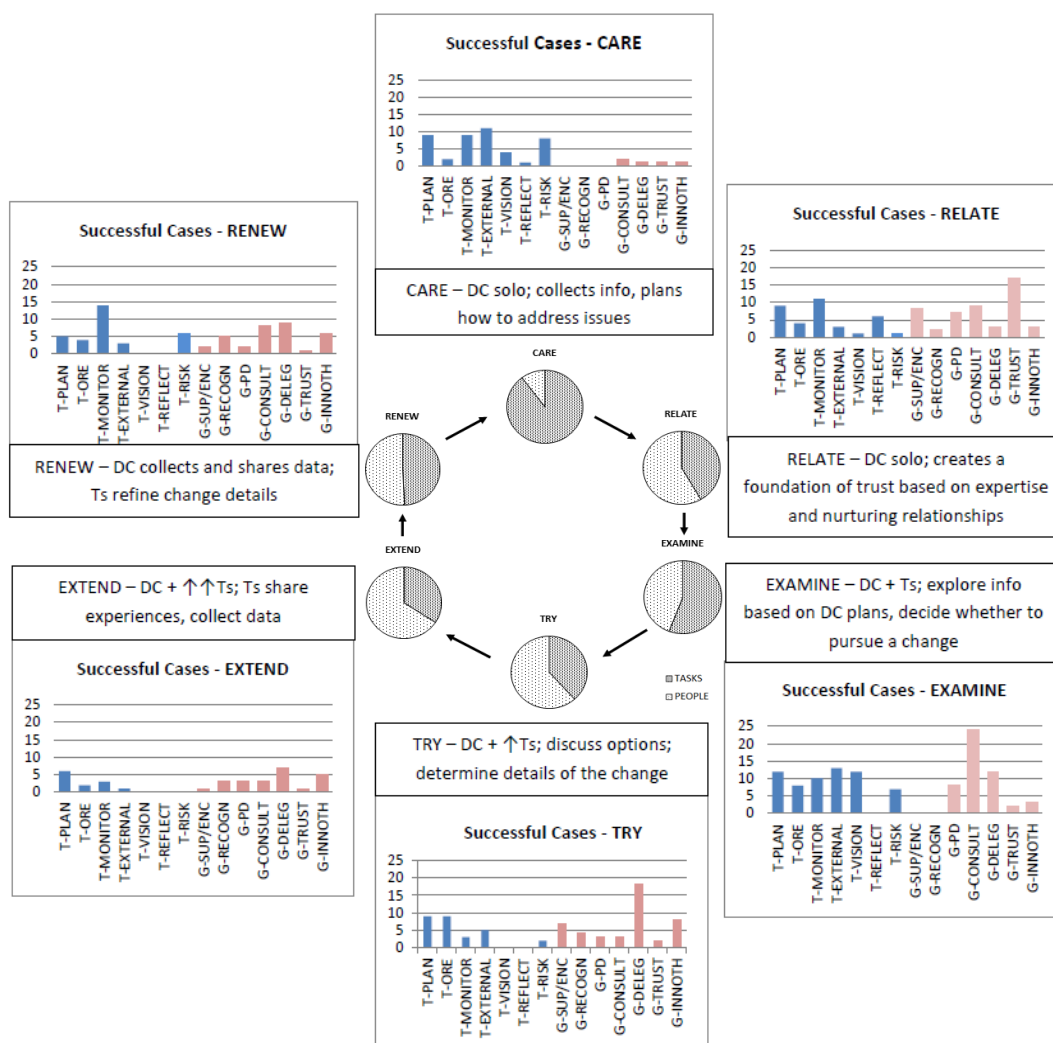


Figure 26. Specific Leadership Behaviors Reported during Various Stages of CREATER Stages

Research Question 6: Why do department chairs alter their leadership behaviors and strategies during stages of the change process?

Department chairs reported using a progression of leadership behaviors as they moved from one stage of the change process to the next. When department chairs were asked why they used different leadership actions during different stages of the change process, many were unsure how to respond. From their perspectives, the use of different

leadership behaviors during different stages of the change process seemed to be natural reactions to different situations. However, some clues to their motivations for using different leadership behaviors emerged from their interview responses, and inferences can be made based on the context which they worked, which was also reflected in their LSI scores. In general, department chairs altered their leadership behaviors as they progressed through different stages of the change process due to (i) their desire to demonstrate their competence as department chair, (ii) their understanding of the importance of relationships with teachers, (iii) their awareness that their ability to accomplish departmental goals relies on their teachers, and (iv) contextual clues and the contours of their department.

Although department chairs in this study had difficulty answering why they changed their leadership behaviors during different stages of the change process, they did intuitively adjust their leadership behaviors as the change process progressed. Their motivations for their adjustments were interpreted to be based on their larger professional goals and their ability to sense the context in which they worked. Additionally, it seems that many department chairs in this study altered their leadership behaviors not only to encourage the change process, but also to protect themselves from the scrutiny of teachers, administration, students, and parents. Much of this type of thinking occurred during the CARE stage, but as context evolved, department chairs continued to adjust their leadership based not only on the change process, but on justifying their positions. For instance, DC1's desire to have common assessments and common standards between like-courses of her two new campuses demonstrated her need to show to administration

and parents that she understood and could defend what teachers were doing on both campuses. The added distance between teachers of these two campuses would make monitoring both more challenging unless there was some conformity between the two, and her understanding of this aspect of her job prompted her interest in this change.

A prime example of department chairs adjusting their leadership behavior during the CARE stage based on their ability to sense the context in which they worked includes their varied responses to different sources of change initiatives. In most cases investigated through this project, department chairs were the primary change initiators and organizers. These department chairs identified issues and sculpted the environment to enhance the probable success of a change. In contrast to these cases, DC7's example of successful change reported that teachers were the change source, while in DC5's example of an unsuccessful change, the source of the change initiative came in the form of an administrative mandate. The motivations for different leadership behaviors in these cases appear to have varied during different stages of the change process based on these change initiative sources.

Department chairs who were the primary source of the change initiative and the department chair who carried out an administrative mandate used the CARE stage to conduct general needs-assessments within their departments. These internal investigations uncovered areas on which department chairs could focus (T-MONITOR); this behavior was accompanied by attentiveness to external factors influence the educational processes within their departments, such as whole-school initiatives, administrative interests, educational research and trends, and community concerns (T-

EXTERNAL). Department chairs used this internal and external examination to identify possible areas of change as they simultaneously prepared to broach these issues with their department (T-PLAN). In these cases, department chair motivation for their principally task-focused behaviors appears to be two-fold: (i) to educate themselves with information from internal (student data, teacher products) and external sources (parent concerns, administrative interests, research and best practice articles), and (ii) to strategically plan how to approach teachers who were currently unaware of areas of possible change. Department chairs understood that they needed to be prepared for the questions and objections that teachers would have to the idea of change. This defense preparation not only enhanced their ability to communicate with their teachers, but it also allowed them to appear competent, knowledgeable, and trustworthy.

In these cases, the two motivating factors for the task-focused behaviors displayed during the CARE stage were reflected in the moderately high LSI scores for Self-Actualization and moderate LSI scores for Dependence. The LSI Self-Actualization scale indicates levels of curiosity, creativity, insightfulness, as well as an interest in learning and growing (LSI, 2011). The LSI Dependence scale measures how people feel about their level of control over situations; people who score high on the measure often rely on others to help them make decisions and set directions (LSI). The moderately high Achievement scores for department chairs mirror their frequent use of analysis of information to improve their job and department performance; their moderate Dependence scores coincide with their recognition that their job performance relied on the talent, support, and cooperation of their teachers. These two motivating factors,

department chairs wanting to demonstrate competence and their recognition of the important role of their teachers, were eluded to when one department chair was asked what advice she would give to department chairs considering a change initiative:

You've got to gain expertise, and more than just reading an article. You have to demonstrate to your staff that you've done your homework and you've at least become a minor expert in something. If they see that you don't have that knowledge, if you're trying to figure it out while they are, they're just going to get frustrated.

Unlike the department chairs who used the CARE stage to prime themselves with information as they began to share ideas with their teachers, the department chair who led the change based on prompts from her teachers used the CARE stage to critically listen to the voices of her teachers as she monitored internal and external information. Her main leadership behaviors included monitoring the activities and data from her department (T-MONITOR) and determining the predisposition of the administration and community to this change idea (T-EXTERNAL), but also involved consulting with teachers on their ideas for change (G-CONSULT). In this case, much of the information the department chair used to determine whether or not to pursue a change came from her teachers, and therefore her focus could be less on how to conduct her presentation of ideas and more on how she could help teachers pursue their change interests. Her motivations for these behaviors relied less on her convincing teachers of her knowledge and ideas, and more on supporting teachers with their interests. This department chair understood that her demonstration of support at this time would allow her to earn the trust of her teachers, which would help her build stronger relationships that would be needed in the future as she pursued other departmental initiatives.

Department chairs used both task- and people-focused leadership behaviors as they built relationship in the RELATE stage; this mix of behaviors indicates department chairs understood that their teachers not only want them to play the role of supporter and encourager, but that they also want a department chair who can do their job well. The combination of these desires motivated department chairs to demonstrate their ability to connect with their teachers, as well as their ability to complete the tasks at hand. This mix of behaviors increased teachers' trust in their leader (G-TRUST), which department chairs in this study understood was necessary for them to be effective leaders.

Department chairs expressed motivation to gain the trust of their department members, and their main avenue to this trust was through proving their expertise and fit for their position, as well as through exhibiting listening and nurturing skills.

In general, LSI scores support this apparent interest in continually improving as science leaders, and therefore demonstrating their competence and gaining the trust of their teachers. Department chair scores were moderately high for Self-Actualization, which indicates department chairs were creative, engaged, and interested in becoming more knowledgeable. One department chair who was heavily involved with science education and highly respected as a leader modestly stated that his relationships were enhanced by his credentials, "My department knows I'm involved with the school and science education issues." This level of trust in his abilities helped him as he approached teachers with new ideas for the development of their department.

Also associated with the RELATE stage, department chair LSI scores were moderately high for Humanistic-Encouraging and Affiliative categories. These scores

indicate department chairs attend to and valued relationships with their teachers, while understanding that these relationships can help teachers develop and contribute to the overall goals of the department. Interestingly, although department chairs also stated an interest in developing relationships and encouraging growth in their teachers, some of their interview comments reflected a mild amount of self-protective motives behind their actions. As one department chair shared, “If you want to stay where you are and if you want to enjoy your career with these people, you don’t want to make a bunch of enemies.” Another department chair stated:

In the early years, it felt like I was wasting time with conversations, but I also knew it would pay off – and it did. I spent time listening and getting to know people – it felt like I spent so much time talking to people that I didn’t get anything done. I wanted to talk with everyone to avoid perceptions of favoritism. It was almost like a defense or preventative move.

An examination why department chair leadership behaviors change during different stages of the change process reveals the importance of their ability to sense teachers’ capability and interest in participating in the change. The progression from the EXAMINE to TRY to EXPAND stages of successful changes, as reported in department chair stories, were marked by a movement from occasionally oblique department chair-guided activities coupled with teacher consultation, to a loosening of the creative reigns by the department chair resulting in increased teacher control of the change initiative. This evolution occurred as department chairs sensed that teachers had invested in the change enough to take ownership of the innovation.

At the beginning of the EXAMINE stage, department chairs in this study were already invested in the idea of change. Based on their commitment, they began planning activities that would encourage teachers to join them on the change journey (T-PLAN). However, while department chairs felt confident that a change should be seriously considered, most teachers did not have the same level of unawareness. Some department chairs strategized ways to begin the change conversations with their teachers by gently planting the seeds of change ideas, and allowing these seeds to grow within teachers over time. This idea of planting the seeds of change was more thoroughly discussed through the analysis of Research Question 3.

In all cases within this study, department chairs avoided outright statements of what changes needed to be made and opted instead to share internal data, information from outside sources (teachers, administration), and research articles (T-PLAN, T-EXTERNAL, T-MONITOR, G-PG). This approach was taken, in part, because department chairs in this study understood that teachers needed to feel internally motivated to participate in a change; department chairs were keenly aware that they possessed little ability to access external motivators to persuade teachers to participate in a change. This led department chairs to strategically present information to their teachers that would allow teachers to see where changes may benefit the department.

In successful cases of change, teachers were able to follow the trajectory generated by the department chair's information, and made logical connections between the provided information and the need for a change. In DC1 and DC2's cases, this shared information included the fact that a new freshmen campus was going to open, which

related to challenges that school-wide change would bring to the department. DC1 also shared the difficulties teachers were having with parent concerns about consistency between teachers, and the ways different teams and departments within their school were solving that problem. DC4 shared with her department best practices on common assessments in the literature, coupled with internal data on the disparate level of rigor found on final exams. DC5 had teachers investigate the objectives on state exams and compared them to their course objectives to identify courses that needed to be re-designed. And, DC8 shared articles on inquiry and the wonder of science to inspire teachers to contemplate how they could bring excitement into their classes. One department chair discussed this seed planting aspect of the EXAMINE stage by sharing her motivation for how she approached the EXAMINE stage with her teachers:

Very often a mistake we make in education administratively is just because you learn how to do something out there, and then we expect you to implement it without bringing teachers along for the journey. You know, it took me months to get to a place where I could say we should do common exams. So what makes me think that in one 20-minute meeting I'm going to convince 35 teachers to agree with me? I have to give them all of the things that I've read that got me there, and give them time to think about it.

In successful instances of change, department chairs recognized during the EXAMINE stage that teachers were amenable to the idea of a change, and were ready and willing to take more control of the change process decisions. As department chairs gained confidence that teachers were interested in pursuing a change, they guided the process to the TRY stage. As teachers understood the need for a change and felt motivated to contribute to the change process, department chairs were able to step back

from organizing the details of the change process, and delegate change process tasks to teachers while still providing support. Department chairs provided teachers with time and objectives (T-ORE) and charged teachers with the tasks of finding innovative ways to bring the change to life (G-DELEGATE, G-INNNOTH). Department chairs monitored teacher progress to make sure that teams were on track with the change without controlling the details of the process. In addition to department chairs clarifying roles and objectives, they also providing support, encouragement (G-SUP/ENC), time and work space, and professional development (G-PD) as needs arose. Some teams required more support from their department chairs than others. As one department chair explained:

You know the type of people you're working with and there's sometimes they might really need you there to kind of support what's going on. Other times their totally self-sufficient, which makes you so proud, you're like, 'Yes! They did it on their own, and I don't have to be there.

As teachers became more invested in the change and advanced their innovative approaches to the change, department chairs continued to provide support and create opportunities for teachers to share their progress during the EXTEND stage. Teachers sharing their progress not only provided inspiration, encouragement (G-SUP/ENC), and professional development to teachers not yet involved in the change(G-PD), but also allowed the presenting teachers to receive recognition for their work and achievements (G-REC). These leadership moves were predicated on department chairs' perception of teachers' ability to complete the work that had been delegated to them and their

investment in the change. It also was motivated by the understanding that micromanagement could weaken the spirit of the change.

In the RENEW stage, department chairs continued to delegate to and support teachers; however, in this stage, more data collection and analysis needed to be conducted to determine the effectiveness of the change, and department chairs usually took charge of these tasks. Teachers used this data, along with their experiences, to devise adjustments that would make their change more effective.

Data shared during this stage was mainly used to inform future actions of department chairs and teachers. Although department chairs were usually pleased with the data they gather from change implementations, no department chair in this study orchestrated celebrations; these department chairs preferred caution when presenting resulting data because they understood that it would be seen as naïve to attribute positive data solely to a single change implementation. As one department chair elaborated on this sentiment:

People who understand data less, believe it more. People who are math and science people understand how data can be manipulated. We're skeptical, and we're trained to be skeptical about the data, and by being skeptical, you let it be open for teachers to talk, you let it be open. People who understand the data less, tend to hang their hat on it. I'm the first one to say, 'Well, looking at it that way shows good results, but, is that the only way to look at it?' and I think my teachers appreciate that. A lot of other administrators were like, 'This is awesome, this 100% works!' and I was saying, 'Well, an N of 1, well its good, and let's share it, but let's not say that this is the only reason the scores are better.' We need more data to say it's the case, and my teachers really appreciated that.

Equally as important as not appearing naïve in the eyes of their teachers, department chairs were careful not to produce celebrations that would appear self-

congratulatory. Department chairs were careful to not take ownership of the change; they understood that it was important that changes be viewed as teacher initiatives and under teacher control, and not as teachers doing the work that their department chair had assigned. This feeling of teacher-ownership was a key goal of department chairs, despite their work towards and investment in the change.

Although department chairs struggled when asked directly about the motivations behind their use of different leadership behaviors during the stages of the change process, clues leading to the “why” of their behaviors during these different stages could be elucidated from their responses to the context of their departments, LSI scores, and interview responses. In general, it appears that department chairs altered their leadership behaviors as they progressed through different stages of the change process due to (i) their need to demonstrate their competence as department chair, (ii) their understanding of the importance of relationships with teachers, (iii) their awareness that their ability to accomplish departmental goals relies on their teachers, and (iv) contextual clues and the contours of their department.

During the CARE stage, department chairs were focused on ensuring that they could demonstrate competence in their job. This competence included their ability to understand the context in which they worked, as well as their ability to respond to the prospect of change based on the origin of the change idea. The key motivation leading to department chair behaviors in the RELATE stage appears to be establishing professional credibility and relationships, not only to promote smooth functioning of the department, but also to protect the department chairs’ image in the eyes of teachers. As department

chairs progress to the EXAMINE stage of the change process, through the TRY stage and onto the EXTEND stage, their behaviors gradually shifted the ownership of the change process from themselves to their teachers. The motivation for this progressive shift included the knowledge that teacher buy-in to the change was essential for success; however, department chair guidance and structure continued throughout these stage to ensure that conditions for change continued to be present and barriers to change were addressed. Finally, department chairs assumed more responsibility during the RENEW stage of the change process in order to focus teachers on successes related to the change and on areas of the change that might require further adjustments.

Researcher Reflections on the Interpretation and Presentation of Results

This research project design and presentation was heavily influenced by Yin's perspectives on qualitative research (2003). My comfort moving from quantitative research in medical research laboratories to qualitative research in the field of education was enhanced by Yin's approach to investigations; his writing allowed me to see that a continuum existed between post-positivistic and constructivist views of knowledge, and therefore, views on research. His writing also helped me to grasp the power qualitative research has to help researchers more thoroughly investigate important questions.

Examples from Yin's (2003) writing that influenced my approach to this project include his viewing of multiple cases as multiple experiments, which allows for literal and theoretical replication. These two types of replication focus on the phenomena or the constructs at the heart of the research investigation, as well as, the story presented by the

cases. This perspective of qualitative research is mirrored by Hartley (2004), who stated that cases provide access not just to themselves for themselves, but to “illuminate theoretical issues being studied” (p. 323). The majority of my project has been influenced by this post-positivist philosophy, due in part to my comfort with the ontological and epistemological foundations, my limited experience with conducting qualitative research, and my interest in the specific but overlapping concepts of leadership and change.

Although I feel most comfortable with Yin’s approach to case study research, as I journeyed through this project, I realized that part of what I was learning from my participants was larger than my research questions, and that these additional aspects uncovered through this research process were meaningful to me and to my participants. Therefore, I’d like to share some of the findings in a slightly different mode, one more influenced by Stake’s (1995) work on qualitative research. Stake emphasizes conducting case study research to fully and richly understand and present the holistic nature of the case itself. This perspective shifts the focus of my analysis, and permits a glimpse at the deeper experiences of the participants in my study. Underneath the data presented in this paper are the stories and the emotions of the department chairs, and these stories and emotions are valuable sources of information that can increase our understanding of department chair’s work and leadership challenges.

Two consistent findings this study brought to my attention were the passion department chairs possessed for their professions, coupled with the vulnerability they felt

as they navigated their roles as educational leaders. Although department chairs understood that promoting a change within their departments would be a stressful and complex endeavor, a frequent theme in their stories was that the obstacles would be worth overcoming because they were doing what was right for their students and for the system in which they worked. However, this motivation did not take away from their feelings of uncertainty as they led their departments through the change process; feelings of uncertainty and self-doubt were regular themes within their stories of change despite the fact that some of the participants are locally recognized as exemplary departmental leaders. Because of their reputations and my admiration of their work, I hadn't expected to hear vulnerability or self-doubt embedded in their stories; however, this was a significant part of the reflections they shared with me as they recounted their experiences with leadership challenges. This internal struggle mirrors my own feelings as I work as a department chair, and I was comforted by the knowledge that even the most talented and respected in my field face similar inner challenges.

Hearing other department chair struggles normalized my own experiences, especially reports by the department chairs who had experienced contentious resisters. As I shared my findings on contentious resisters during the final interview, department chairs who had experienced this personal barrier expressed relief that they were not alone in this experience, and that the phenomena was not an indication of their abilities to lead change. This type of response was also seen in a more general sense when department chairs learned of the difficulties others faced in their stories of change: Not only did they

convey feelings of relief for themselves as they considered their own experiences, but they also expressed strong empathy for their unnamed colleagues within this study. These emotions seem to be based on an understanding of the difficulties department chairs face as they work to promote change in their departments. There was consensus that they understood that their job was meaningful and important, but that it could also be unpredictable, stressful, and confidence-shaking.

As I consider how this project could be used for department chair professional development, this human side presented by participants of this study seems to be a powerful aspect to share, based on not only my own reaction to the participants' experiences, but also based on their own reactions as they learned of their colleagues' experiences. The internal struggles that occur when leading change, especially in situations in which the leader relies on referent or expert power, is an aspect of change and leadership that emphasizes the human experience. It might help leaders to expect, acknowledge, and accept these emotional challenges, as they undoubtedly will face uncertainty and self-doubt as they work for educational change.

Conclusion

This research explored leadership behaviors as recounted in the change stories of six science department chairs. Details related to these stories of department chairs leading change were collected through interviews, document analysis, and a leadership survey. Implications of these findings and related recommendations are presented in the next and final chapter of this study.

Leadership behaviors reported in department chair stories were interpreted and classified through the use of The Leadership Grid (Blake & McCauley, 1991) and further delineated through the use of leadership behaviors identified by Yukl et al. (2002). As department chair stories of leading change within their department unfolded, department chair leadership behaviors were connected to change process barriers and stages of the change process. Change process barriers were identified when conditions of change (Ely, 1990) were absent in department chair stories, whereas stages of the change process were identified through the use of Havelock and Zlotolow's CREATER model (1995). These lenses related to leadership behaviors, conditions for change, and change process stages were used to explore the following research questions:

1. How do department chairs describe their experiences with barriers to change?
2. In what ways do department chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
3. Why do department chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
4. How do department chairs describe their experiences and roles as leaders during stages of the change process?
5. In what ways do department chairs alter their leadership behaviors and strategies during stages of the change process?
6. Why do department chairs alter their leadership behavior and strategies during stages of the change process?

Findings related to the first three research questions, which focused on barriers to the change process, include that barriers often emerged indirectly in the form of teacher resistance. Most sources for resistance in department chair stories could be traced to an absence of Ely's (1990) conditions for change, such as deficient knowledge and skills, satisfaction with the status quo, and a lack of participation in the decision-making process. However, one of the most damaging sources of resistance was teacher dissatisfaction with the current department chair. Department chairs were often able to use leadership behaviors to overcome barriers to change, such as providing professional development, consulting with teachers, and delegating change process tasks to teachers, but teachers who were resistant to change based on their opposition to their leader, or how their leader was selected, were not easily appeased by department chair actions in these stories of change.

Most department chairs struggled to identify why they used certain leadership behaviors when facing different barriers to change; they viewed their adjustments in leadership behaviors as obvious responses to stimuli. However, department chair motivation for their adjustments to their leadership behaviors appear to revolve around (i) their need to demonstrate their competence as department chair, (ii) their understanding of the importance of relationships with teachers, (iii) their understanding that their ability to accomplish departmental goals relies on their teachers, and (iv) contextual clues and the contours of their department. Department chairs were able to more clearly reflect on their motivations for two leadership activities, teacher team construction and strategizing how to plant the seeds of the change ideas in teachers. Additionally, a closer examination

of the context present in more difficult change attempts, along with LSI results, provided insight into department chair leadership choices: The more contentious the context, the more self-protective leadership behaviors emerged.

The remaining three research questions connecting leadership behaviors to the change process uncovered the presence of CREATER stages in the stories of department chairs leading change. However, the RELATE stage in this study emerged less as a stage and more of a continuous foundation of relationships, and the ACQUIRE stage appeared less often due to its integration into the TRY stage, and due to the nature of school systems of funding and time allotment. Leadership behaviors at different stages of the change process evolved as the change process progressed, starting with independent activities of the department chair in the CARE stage to teachers taking a larger amount of control of the change process in the EXAMINE, TRY and EXTEND stages. This shifting of change process ownership and associated leadership behaviors appeared to be a natural outcome of the department chair's ability to trust teachers' investment in the change, as well as their interest in being perceived as worthy of their positions.

CHAPTER V

DISCUSSION

Academic department chairs are expected to manage the operations of their departments while leading meaningful change to improve the effectiveness of their programs, curricula, and faculty (e.g., Fenney, 2009; Hannay & Erb, 1999; Lucas, 2000; Sergiovanni, 1984; Tucker, 1993; Wettersten, 1994; Zepeda & Kruskamp, 2007). To ensure that students receive the best education possible, department chairs often oversee changes that are devised as responses to global and local pressures, and evolving educational philosophies and research (e.g., Fenney, 2009; Tucker, 1993; Wettersten, 1992). However, secondary department chairs often have little authority, and therefore have limited power to institute unilateral changes (Tucker, 1993). In addition, they often play a middle-man position, balancing the desires of their faculty against those of their administration (Gmelch, 2004; Hannay & Erb, 1999). These conditions raise a provocative question: If department chairs possess limited power and need to balance the interests of various stakeholders, how do they institute meaningful curricular reform within their departments?

To explore this question, this study investigated how six secondary school science department chairs experienced the process of leading successful and unsuccessful change attempts. Combined, these department chairs described six stories of successful change

and four stories of unsuccessful change through a series of interviews and related documents. They also completed a leadership inventory (Life Styles Inventory: LSI).

From these data sources, connections were drawn between reported leadership strategies and behaviors, as identified through The Leadership Grid (Blake & McCauley, 1991) and Yukl et al.'s (2002) leadership behaviors, and their experiences of both (i) change process barriers as derived from Ely's (1990) conditions of change and (ii) change process stages as illustrated by the CREATER model (Havelock & Zlotolow, 1995). This focus set the foundation for the following research questions:

1. How do department chairs describe their experiences with barriers to change?
2. In what ways do department chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
3. Why do department chairs alter their leadership behaviors and strategies in response to contextual barriers to change?
4. How do department chairs describe their experiences and roles as leaders during stages of the change process?
5. In what ways do department chairs alter their leadership behaviors and strategies during stages of the change process?
6. Why do department chairs alter their leadership behavior and strategies during stages of the change process?

The findings of this study provide support for both Ely's (1990) conditions of change and the CREATER model (Havelock & Zlotolow, 1995) of change process stages. An additional barrier not related to Ely's conditions of change was also

identified: the contentious resistor. Data from this study furthermore fills a void in the change and leadership literature: No research has connected change models with specific leadership theories (Herold et al., 2008). The results of this study reveal this currently undescribed connection between specific participant leadership strategies and behaviors to both (i) change process barriers as described by Ely (1990) and (ii) change process stages as described by Havelock and Zlotolow (1995). In addition, other findings revealed that department chair strategically approached team creation and planting the seeds of the idea of a change, frequently mentioned chemistry teachers as resistors within the system, and expressed general leadership inventory characteristics that seemed to be influenced by department chairs' working environments.

This chapter summarizes this study's findings and connects them to literature in the field. It also describes potential implications of the findings and makes recommendations based on these results. Finally, this chapter closes with some of my personal reflections on this study and suggests areas for future research on secondary school department chairs, leadership, and the change process.

Findings, Implications, and Recommendations Related to Change Process Barriers

Change process barriers, defined by this study as the absence of Ely's (1990) conditions for change, emerged almost exclusively from the source point of the teachers. Barriers in this study were rarely inanimate forces, such as time or resources, and rarely did they originate outside of the department; barriers within this study manifested primarily through "teacher-resistance." Based on the data from this study, Ely's

condition of “dissatisfaction with the status quo” was the strongest predictor of successful change attempts, and the lack of this condition was the strongest predictor of change attempt failure; this condition was present in all successful stories of change and was absent in all unsuccessful change stories. Other conditions that appeared to play a role in enhancing the probable success of a change attempt included members’ “knowledge and skills” and “participation in decision-making” related to the change. Most resistance explored in this study connected to the lack of Ely’s conditions for change however, a source of resistance not described by Ely’s conditions was also identified: the contentious resistor.

Dissatisfaction with the Status Quo and Possessing Adequate Knowledge and Skills

The level of impact and importance of Ely’s (1990) conditions of change appear to vary based on the context in which the change occurs and the characteristics of the individuals involved in the change process (e.g., Bauder, 1993; Ensminger & Surry, 2008; Jeffrey, 1993; Ravitz, 1999; Read, 1994; Surry et al., 2006). This study supports these findings that different conditions of change vary in effect based on context. In the contexts studied within this investigation, as in the study completed by Ravitz (1999), teachers feeling “dissatisfied with the status quo” appeared to be essential for successful change attempts.

Feelings of dissatisfaction with the status quo was the only condition achieved in all successful instances of change investigated by this project, and this condition was lacking in all unsuccessful instances of change as described in department chair stories. Other supporting conditions included teachers having the appropriate “knowledge and

skills” needed to understand and participate in the change process, access to “time and resources” (and by inference, “commitment” by administration to general change processes), “leadership” by department chairs, and involvement in the “decision-making” process; however, the presence of these conditions without teacher “dissatisfaction of the status quo” was not sufficient to ensure successful change. The presence of this condition in all successful instances of change and the absence of this condition in all unsuccessful instances of change within this project, combined with previous findings presented in the literature, indicate that this may be one of the most essential conditions for successful change implementation.

With the conditions of time, resources, implied commitment, and leadership set in place by the existing structure in all schools within this study, department chairs focused on cultivating additional conditions of change within their teachers, such as dissatisfaction with the status quo, adequate knowledge and skills, and participation in the decision-making process. In these stories of successful and unsuccessful change attempts, department chairs first assumed the role of an independent “researcher” during the CARE stage as they detected and analyzed teachers’ level of satisfaction with the status quo, gathered additional internal and external sources of data related to their departments, and evaluated the level of knowledge and skills of their teachers. They then acted as independent “strategizers” as they considered how to increase their teachers’ knowledge and skills in a manner that subtly or overtly increased their feelings of dissatisfaction with the status quo. These roles supported department chair future roles as

catalysts, process-helpers, and solution-givers as they worked to overcome change process barriers and create conditions for change.

During our final interviews, department chairs expressed interest in learning that most participants in this study provided professional development (G-PD) to increase teachers' knowledge and skills in order to promote teacher dissatisfaction with the status quo. For instance, department chairs shared articles during department meetings to prompt teachers' thoughts on new ideas in the field. This information was usually presented with the hope that teachers would re-evaluate, and become dissatisfied with, their current situation, thus sparking thoughts on the need for change.

This particular connection between the conditions of "knowledge and skills" and "dissatisfaction with the status quo" appears to be sequential and, as demonstrated in this study, can be influenced through department chair leadership behaviors as illustrated in Figure 6. Much of this professional development was strategically implemented as the department chair played the role of a "catalyst" during the EXAMINE stage, and was frequently presented without the department chair expressing interest in change; however, department chairs who were able to take this approach chose to do so with the trust that their teachers would connect their new knowledge to the need for a change.

When data related to this connection between the conditions of "knowledge and skills" and "dissatisfaction with the status quo" was shared, one department chair stated that, "I think that's what we struggle most with, trying to get teachers to figure out that what they are doing (presently) is not as good as they think." He went on to describe recent a conversation other department chairs in his school:

I was talking with other DCs in my school and that was the number one thing that came up. He said, “I had video tapes of all of my teachers and I showed them to them and I was so disappointed that they didn’t see these flaws that I saw. They picked out small things, like, ‘Oh yea, I didn’t realize I muttered so much.’” They weren’t picking on things that he thought were real reasons why their lessons weren’t so exciting or interesting, and he was disappointed with them that they couldn’t pick up on it themselves.

As this department chairs and I explored the discussion he had with other department chairs at his school, we discussed the idea that perhaps teachers need to be educated and directed to focus on a specific aspect of teaching or curricula of interest to the department chair. This would require increasing teachers’ knowledge and skills so they understand what to look for within their work, along with why it is important. As this conversation continued, we acknowledged that the amount of time it would take for department chairs to provide this level of professional development to prompt dissatisfaction with the status quo is possibly more than what most department chair and teacher positions permit.

Participation in the Decision-making Process

Darling-Hammond (2001) stated that for educational reform attempts to succeed, teachers need to be brought into the change process, either by bringing the idea of change to the system, deciding on whether to accept the change, designing the change, or creating the change implementation process. Therefore, any leader attempting a change within their educational system should pay special attention to the role teachers’ play in the change. This role of teachers in the change process is reflected in Ely’s (1990) condition of “participation in the decision-making process.” In most cases of change in

this study, department chairs were aware of the importance of teacher involvement:

Department chairs strategize how to bring teachers into the change process during the CARE stage, acted as a catalyst to prompt teacher involvement in the decision-making process during the EXAMINE stage, and then, if the change was progressing successfully, played the role of a change process-helper as they continued to increase teacher involvement during the TRY and EXPAND stages.

Although department chairs often discussed the idea of encouraging teachers to have a voice in departmental changes, involving teachers in the decision-making process also helped department chairs more thoroughly understand the implications of possible changes, and thereby refine change ideas based on the knowledge and experiences of their teachers. When department chairs were able to truly hear the concerns and ideas of teachers during the EXAMINE stage, they were able to adjust the change or determine that a change was simply not going to work, either due to the change itself or due to the reaction of teachers to that particular idea of a change. In most cases of change, department chairs valued the perspectives of their teachers and saw their conversations with teachers as an opportunity to learn from teachers and their expertise, even if the responses were not positive. This barrier, therefore, not only impacted the change process by creating resistance in teachers who did not participate in change process decisions, but it also created barriers due to the department chair not receiving important information about the change and the change process.

This tendency to trust, as well as build trust, (G-TRUST), and consult (G-CONSULT) with teachers about change is reflected in department chairs LSI Dependent

style scores; this score was one of the highest scores within the Passive-Defensive cluster of leadership behaviors, although still low compared to national norms. This style of leadership is not viewed by the literature as a positive trait; however, in certain contexts where the leader lacks coercive or reward power, or in contexts where the followers are especially trained or knowledgeable, this Dependent style may help leaders listen to and learn from their subordinates. This tendency to depend on the thoughts and ideas of their teachers might have increased department chairs' inclination to involve teachers in the decision-making processes connected to the change attempts. In most of the successful cases in this study, and in the one unsuccessful case that ended smoothly, this ability to involve teachers by listening and responding to their feedback appeared to help department chairs maintain a trusting, cohesive, cooperative, and focused department.

Contentious Intent

All barriers identified within this study emerged in the form of teacher resistance, and in most instances, the source of this resistance could be traced to Ely's (1990) conditions of change. However, a powerful form of resistance emerged from this study that could not be connected to Ely's conditions of change: The contentious resistor. Three of the six participating department chairs reported this type of resistance to their change attempts from teachers who had either been the previous department chair but had stepped down, or had interviewed for the department chair position but were not chosen. These teachers created barriers not based on their opinions of the change suggestion, but based on their feelings towards their current department chair. In these situations, the

department chairs had been unable to establish any form of leadership power with these individuals, and therefore were unable to move these teachers to accept or explore the idea of change. Although examining these cases of contentious intent through Ely's conditions of change does not appear to provide insights into this phenomenon, viewing these situations through the lens of leadership power may present an avenue leading towards a deeper understanding of this experience.

Leadership can be viewed as power association that relies not only on the characteristics of the leader in the relationship, but also on the characteristics of the followers (Northouse, 2001). The structure of the secondary school department chair position precludes department chairs from having two of the five types of leadership power described by French and Raven (as described in Braynion, 2004): Coercive or Reward Power. These two types of power rely on leaders being capable of producing punishments or rewards in levels sufficient to induce compliance of followers (Braynion, 2004). Because these two forms of power are unavailable to secondary school department chairs, they must rely on one or more of the three remaining forms of power: Legitimate, Referent, or Expert power. Legitimate power comes from followers recognizing that their leader has the right to lead them, and therefore, they understand that their role is to comply with the leader's instructions. Referent power is gained when followers admire their leader, and therefore want to be like their leader or gain the approval of their leader. Expert power is achieved when followers view their leader as possessing knowledge and skills that are valued or necessary to their work.

In the stories of contentious resistance explored in this study, none of the three available power relations had been established between the department chairs and the teachers who were the source of the contentious intent: The contentious teachers did not accept the legitimacy of their leader, they felt no admiration of or need for approval from their leader, and they did not recognize the value that their leader brought to their department. To counter these instances of contentious resistance, it is possible that legitimate power could be enhanced through administrative intervention, referent power could be enhanced through relationship building, and expert power could be achieved as the department chair continued to demonstrate their expertise. As each department chair shared in their stories, they described this form of resistance as the most difficult to address, especially in a short amount of time and with limited involvement of administration, and the most painful to experience.

Two leadership strategies and behaviors used by department chairs to address contentious resisters who were threatening the change process were to directly discuss the situation with the resistor and to reorganize content area teams. Directly addressing the resistor to establish expectations and role designations (T-ORE), as DC5 attempted, seemed to increase the perception of his legitimate power. Reorganizing teams (T-PLAN), a frequent leadership behavior that is discussed later in this chapter, was also used in these situations in attempt to reduce the impact of the resistor on the change process.

As I shared the stories of contentious resistance with department chairs during our final interview, the department chairs who had shared their stories with contentious

situations expressed relief that they were not alone in their experiences, but they were also dismayed at the prevalence of this form of professional interaction and the apparent inability to redress it. Surprisingly, when department chairs who had not reported experiencing contentious resistance in their previous interviews listened to these experiences, they responded by sharing their own stories of experiencing contentious situations in their past or of hearing about contentious situations in other departments. One department chair had not experienced contentious reactions from teachers shared that,

The DC for two years before me was from the department and the other teachers did not like her, and like, what you're saying is so true, it's so common. That's why it's might be healthier to hire from the outside as a neutral party.

When asked if she thought that administration should have a role in mediating this type of situation, she implied that administration could help the department chair establish legitimate power through her reply:

I think it's how it's handled at the administrative level. They need to be upfront and say, 'Now how are you going to handle this if you don't get this position?' And, it's kind of hard for the new DC to go to their teachers and say, 'Hey, you're kind of treating me like dirt here.' That's may be where administration steps in, 'You know when we interviewed... and now we need you to follow through with what you said.'

During my final interview with a department chair who had been experiencing a contentious situation with a teacher who had been the previous department chair reported that he has recently made progress with this individual. When we explored how he accomplished this progress, he stated that honest confrontation on their respective roles

helped, possibly by beginning to establish his legitimate power, and so did his work on building a relationship with resistant teachers, perhaps by enhancing his referent power:

The one thing about my teachers who had been resistant is that they didn't even want to have a relationship with you. They wouldn't even say hi to me. It wasn't until they saw me asking about their family, where I kind of put myself out there to get to know more about them, not about work, but about them as a person. I think they see us as administration and supervisors, they don't see that we're vulnerable, that were not iron-clad. I think that willingness to get to know them on a personal level can help with that.

In addition to contentious resistance emerging possibly based on the failure to establish one or more of the five main types of power between leaders and followers, contentious resistance might also arise from individuals feeling that they have lost, or have not yet attained, their own power to influence their organization (Goltz & Heitapelto, 2008). This was alluded to by a department chair who had not experienced contention in the story of change she had shared for this study, but during the final interview she shared that she did have a teacher who often expressed contention in general. From this department chair's description, it seemed that this individual expresses resistance not due the lack of a power relationship with her department chair, but due to her own feelings of loss of, or desire for, power:

I have one person who I'd say is contentious, and what I've learned this year is that she is less contentious if she is empowered. When she feels she is on the stage, she is no longer contentious. She needs that recognition, she needs to feel needed. It was a real learning curve for me this year to go, 'Ok, she's not constantly in my back, what's different this year?' This year she's part of the walkthrough committee, where she is feeling like she's part of something. Maybe we (department chairs) need to do more, give them something that they can buy into.

Department chairs who had experienced contentious environments during change attempts, similar to all department chairs in this study, were in situations in which they had little authority over the teachers within their department, and therefore had to rely on their leadership strategies and behaviors to convince teachers to compromise and participate in the building of relationships. This illustrates department chairs' lack of coercive and reward power, and their reliance on establishing legitimate, referent, and expert power with their department members. This co-dependent relationship with teachers probably influenced the three department chairs in the contentious situations to score higher than the other department chairs on their Avoidance and Dependence LSI scores. The context in which individuals work influence their LSI scores and these two scores in particular often emerge when leaders are concerned about self-protection; they often avoid taking risks, fear rejection, or feel threatened (LSI, 2011). In these situations, department chairs expressed anxiety and stress over their inability to gain the respect and cooperation of their resistant teachers.

Opportunities Presented by Change Barriers within this Study

Barriers to change within this study emerged almost exclusively in the form of teacher resistance. Most literature views resistance through the broad lens provided by Zaltman and Duncan (1977) as having either a cultural, social, psychological, or organizational source; however, as Dent and Goldberg (1999) point out, Lewin in the 1940's might have more accurately described general resistance as an interaction between the change participants and the context. This systemic view of resistance overlaps with Zaltman and Duncan's category of organizationally sourced resistance, and places

resistance in a more logical and approachable category: Although resistance might arise from change participants contentious intent, often resistance occurs following change participants' thoughtful reflections on the change, the impact the change could have on the system, or how the change could affect participants' work. Viewing resistance as a logical response allows change agents to strategize their approach to introducing a change idea.

According to Ford et al. (2008), leaders who are interested in initiating a change need to communicate clearly with change participants so they may reflect on and consider the change idea. He suggests that leaders should present their reasoning for their change idea, communicate their honest assessment of the chance of success, and be open to change participants' ideas. Through this openness and a logical approach, change agents can use resistance as a tool to more thoroughly understand and explore a change idea (Ford et al., 2008). This is reflected in this current study: Department chairs who were accepting of teacher ideas resulted in either (i) a joint decision, based on concerns raised and the context in which the change was to occur, to abandon the change attempt, or (ii) a joint decision, based on the change implementation refinements determined by the group, to continue with the change. Cases within this study that were unable to elicit or hear the concerns and feedback of teachers were the cases in which change attempts were unsuccessful, and failed in a manner that was damaging to the system. This indicates that department chairs should view resistance solely as a barrier to change, but an aide to making solid change decisions.

Change Process Barrier Suggestions for Department Chairs

The findings of this study reveal that the main barriers department chairs encounter when attempting to implement a change were teachers' satisfaction to the status quo, which was loosely connected to the barrier of teachers not possessing adequate knowledge and skills, followed by deficient participation in the decision-making process. These three barriers relate to Ely's (1990) conditions of change, which describe contextual conditions that enhance the chance that a change attempt will succeed. The other main barrier encountered by department chairs that was not connected to Ely's (1990) conditions of change emerged from teacher dissatisfaction, not with the change implementation, but with their current department chair. This latter form of resistance may be most appreciated through the lens of the establishment of power relations between leaders and their followers.

The following suggestions were derived from department chair stories of successful and unsuccessful change, and can be viewed as general suggestions, as well as suggestions that relate to Ely's (1990) conditions of change that were identified as being the most critical to successful change. Where applicable, these suggestions connect to leadership strategies and behaviors as used within the analysis portion of this study, and as described by Yukl et al. (2002).

- Learn about your department (T-MONITOR). This information not only helps with the management of the department, but also provides department chairs with information on where changes may benefit the department.

Additionally, teachers usually do not have a full view of the functioning and

efficacy of their collective work, and educating them (G-PD) on the holistic view of the department can help them understand how they fit into the larger picture. This information can also be used to begin planting the seeds of the idea of possible change in the minds of teachers, and can cultivate feelings of dissatisfaction with the status quo. This action may also increase the perception of the department chair's legitimate power.

- Learn about what others are doing in your field (T-EXTERNAL) by attending conferences, reading professional literature, and meeting with other department chairs. The information learned through these avenues increases department chairs' knowledge base, which promotes the department chair's expert power. This can enhance teachers' trust in the ideas of their department chair, which is important as teachers consider whether to embark on a change based on their dissatisfaction with the status quo.
- Educate teachers on general topics associated with possible areas of change (G-PD). Due to department chair connections to the wider view of science education, department chairs can serve as a conduit for teacher professional development. However, the amount of information in the field is large and varied, so department chairs should strategically choose related topics that will not overwhelm or frustrate teachers; topics should have common themes that support and enhance the direction and philosophies of the department. As connections are made in the minds of teachers, they will begin to become dissatisfied with the status quo. This information could provide recognition of

teachers' work, talents, and results, as well as increase perceptions of expert power.

- Solicit feedback from teachers (G-CONSULT, G-TRUST). Strategically share information with teachers and ask questions to prompt thoughtful responses. Ask for feedback through group and one-on-one discussions, as well as through written anonymous feedback. Knowing teachers true feeling about topics are vital for department chairs to be able to determine whether they should pursue a change. This information, like department discussions, builds trust and prompts teachers to begin participating in the decision-making process.
- Be open to resistance as a path towards successful change (G-CONSULT). Teachers are valuable resources, capable of identifying and exploring positive and negative possibilities related to possible changes. Hesitance or resistance is a part of the decision-making process that can help the department chair and teachers determine the feasibility of continuing to explore topics associated with potential change.
- Be patient (T-PLAN). As department chairs strategically share information with their teachers, they need to allow time for teachers to consider the merits and possible implications of that information. Change adopters have been found to follow a basic psychological development as they move from not knowing about the change to accepting (or rejecting) the idea of change. The processing sequence that many change adopters' progress through is detailed

in Hall, Wallace, and Dossett's *The Intended Adopter* (1973), which presents the Concerns-Based Model (CBAM). When people first consider adopting a change, they ask logical questions, such as, "What is the change?", "How will this change impact me?", and "Is there a change that might work even better?" These questions are natural, and time for teachers to consider the answers must be provided so their comfort level increases enough for them to switch to feeling dissatisfied with the status quo and to want to participate in the decision-making facet of the change process.

- Remind teachers of the aspect of their job that relates to their calling (T-VISION). The day-to-day work of teachers is intense, and this intensity may cause them to lose perspective on the larger goals of their profession. This re-focusing can open their minds to potential changes that can be implemented to reach this grander goal and can influence teachers to be more active in the decision-making process associated with exploring and devising change.

The additional following suggestions were derived from department chair reflections sparked by stories of contentious situations that not only disrupted department chairs' ability to enact change, but also challenged their ability to lead their departments. Each contentious situation has unique aspects that need to be contemplated when choosing how to respond.

- Reorganize teams to reduce the impact negative teachers have on others (T-PLAN).

- Directly address the problem with the contentious teachers (T-ORE).
Department chairs should clarify the teachers' role in the department and ask them what can be done to help them adjust to these roles. This will also help establish legitimate power.
- Determine the strengths of these teachers and place them in charge of an initiative that they will enjoy, and provide public recognition for their efforts (T-PLAN, G-REC/ENC, G-DELEGATE). This can mitigate teachers' feelings of loss of influence in departmental matters.
- Administration showing support for the department chair (T-ORE) can increase the perception of the department chair's legitimate power while allowing the department chair to focus on nurturing relationships with teachers.

Findings, Implications, and Recommendations Related to Change Process Stages

In addition to Ely's conditions of change, this study analyzed department chair change attempt stories through the framework of the CREATER model (Havelock & Zlotolow, 1995). This model expands upon Lewin's (1947) Unfreeze-Move-Refreeze model of the change process, which has also served as the foundation for other change process models (Fullan, 2001); however, by focusing on the role of the change agent, the CREATER model expands these fundamental stages of the change process and also provides a planning and needs assessment CARE stage. The findings of this study validate most stages of the CREATER model. This study also connects specific

leadership strategies and behaviors as described by The Leadership Grid (Blake & McCaule, 1991) and further delineated by Yukl (2002) to stages of the CREATER model. Finally, by examining both successful and unsuccessful instances of change, this study identified the EXAMINE stage as the point in the change process that required department chairs to be especially attentive to how their teachers felt about the prospect of a change.

The CARE Stage

When I shared the compiled findings about leadership strategies and behaviors during the CARE stage with department chairs during the final interview session, they expressed an understanding that they were responsible for monitoring the operations and effectiveness of their departments (T-MONITOR), as well as for monitoring information from outside their departments, such as education literature, community developments, and administration interests (T-EXTERNAL). This study's findings on department chair leadership strategies and behaviors implemented during the CARE stage matches Havelock and Zlotolow's (1995) description: Through climate and needs assessments, along with the processing of other internal and external data, the change agent identifies areas that could possibly benefit from a change. Although Havelock and Zlotolow do not identify any particular change agent role for this stage of the change process, it seems that the role that department chairs played during this stage was that of an independent "researcher" and "strategizer," both of which prepared them to play the later role of "catalyst" and change "process-helper" as stages progressed.

During the CARE stage, department chairs played the role of “researcher” as they worked to understand the interactions of curricula, student performance, personnel, and teaching approaches within their departments (T-MONITOR), as well as to understand the larger context of their field (T-EXTERNAL). Analyzing these two broad sources of information allowed department chairs to identify department strengths and weakness, and therefore localize areas where changes may benefit their department and the students they serve. They then selectively used this information in their role of “strategizer” to plan future activities (T-PLAN) and plant the seeds of an idea of possible change within their department members at the start of the EXAMINE stage. Prior to having access to this information, neither the department chairs nor their teachers had the knowledge necessary to recognize that a change might benefit the system. This stage is foundational for specific change attempts; change agents must understand the needs and the contexts of their organization to determine if a change is needed, then strategically approach their change attempt process.

The RELATE Stage

Discussions during each subsequent interview with individual department chairs elicited similar reflections related to most stages of the CREATER model; however, department chairs increasingly shared additional rich and thoughtful insights, self-reflections, and revelations on their strategies and behaviors associated with the RELATE stage. It seems that this additional information emerged because department chairs had been inspired by our previous interview discussions to reflect upon how they approach this critical, and potentially difficult, aspect of leadership. It appears that the main roles

department chairs played during this stage revolved around being a “knowledge-holder,” “guide,” and “supporter.” During this stage, department chairs gained trust of their teachers (G-TRUST), and nurtured conditions that later enabled them to play the role of change “process-helper.”

During the RELATE stage, according to Havelock and Zlotolow (1995), change agents build trust, establish relationships, and identify potential resisters. Havelock and Zlotolow recognized that this stage requires patience, and this was evident in the stories of department chairs, especially in the stories shared by department chairs that had experienced contentious environments. Department chairs who were not currently in contentious situations also shared that they purposefully worked to build relationships with their teachers, and that this took, and continues to take, time. Although the CREATER model describes the building of relationships as a “stage” in the CREATER model that can overlap with the CARE and EXAMINE stages, department chairs in this study portrayed it as an ongoing, effortful, and strategic foundation from which they gain support not only for change implementations, but also for the basic management of their departments. As DC8 stated, “If you can’t get people to work with you, you’re not going to make it.”

During our final interview session, DC4 shared one of the ways she established connections with teachers: “I pick one personal thing and be sure to bring it up with them. And connect it to something in your own life.” Her examples included a teacher who had a strong bond with her dog, and so this department chair would ask about this teacher’s dog and tell stories of her own pets. This created a safe topic for them to share

that was outside of the realm of work. Another department chair, one who had experienced a contentious faculty but who had been recently making progress with them stated,

I have a teacher desk out there, and if I don't sit there, I think my teachers miss me. So for 8th period lunch, I sit there with my teachers. And they said, 'When you come out here, we want teacher-Brian, not admin-Brian.' We don't talk about work, we talk about other things.

The EXAMINE Stage

Unlike the RELATE stage, which was a diffuse and continuous process, the EXAMINE stage had a specific beginning and end in the stories of change explored in this study. The beginning of this stage was marked by department chairs playing the role of a “catalyst;” they shared information with teachers that either directly introduced a change initiative, or was designed to indirectly lead teachers to consider a possible change idea (T-PLAN). Although the EXAMINE stage in a few change stories began with department chairs communicating that a change was eminent due to an administrative mandate or a district event, most department chairs began this stage by planting a seed that they hoped would grow into teacher-generated ideas for change. Department chairs in this latter camp would share articles, internal or external data, or general information related to a departmental problem or opportunity (G-PD), then pose questions that enticed teachers to consider the topic (G-CONSULT). In response to the common occurrence of this strategy, one department chair stated, “It’s kind of manipulative, but by the time I bring it to them, I know how I feel about it.”

In addition to department chairs in this study understanding the necessity of providing teachers with information, motivation, and processing time to understand the need for a change, the EXAMINE stage also afforded department chairs additional information in the form of teacher feedback. Department chairs in this study were rarely the most experienced teachers in their departments, and they consistently reported that they held their teachers in high regard. This recognition of their teachers' knowledge and experience helped department chairs refine changes or determine if a change was worthwhile. As one department chair stated about her conversations with her teachers, "They taught me so much about teaching." Department chairs within this study viewed the collective knowledge and experiences of their teachers as a valuable resource, and teacher feedback during this stage appears to be the critical indicator of whether a change attempt would be successful.

Although characteristics of successful and unsuccessful instances of change in this study were similar during the CARE, RELATE, and the beginning of the EXAMINE stages, it seems that the first indications that a change would be successful or unsuccessful emerged during the mid- and late-EXAMINE stages. In successful instances of change, teachers understood and eventually agreed with the change trajectory the department chair had originally identified on their own during the CARE stage. In one of the four unsuccessful cases, the department chair listened to and understood that her teachers were not going to buy-in to the change she was pursuing during the EXAMINE stage. Therefore, she was able to take their feedback and decide to end the

change attempt. This decision allowed her exhibit respect for the opinions of her teachers and continued to gain their trust (G-TRUST).

The TRY Stage

In the three remaining unsuccessful instances of change, a proportion of the teachers did not buy into the idea of change during the EXAMINE stage. These teachers were not overt in their opposition to the change in the presence of their department chairs, and therefore the department chairs in these cases did not detect their resistance. Because department chairs missed this valuable information, they prematurely progressed to the TRY stage, and it was during the TRY stage, which is characterized within this study as relying on increased delegation to teachers, that their change attempts dissolved.

Considering the four unsuccessful changes within this study, the one that resulted in the least amount of angst in the department chair was the instance where the department chair understood that she needed to end the change attempt. Her ability to communicate with her teachers and respect their opinions may not have resulted in her achieving the change she envisioned, but it did result in a greater trust between her and her teachers (G-TRUST). On the other hand, department chairs who were unaware that the change was in jeopardy until the TRY stage suffered from the general effects of disgruntled teachers. It is possible that if these department chairs had detected teachers' feelings about the change during the EXAMINE stage, they could have either jointly decided to end the pursuit of a change, which would have continued to cultivate a climate of trust and respect, or they could have continued to explore the change idea through

professional development and possibly have been able to prompt teachers to participate in the change process.

In successful instances of change, once a department decision had been made to continue with a change attempt during the EXAMINE stage, department chairs played the role of change “process-helper” as they transferred more control of the change process over to teachers during the TRY stage. Department chair leadership activities during this stage included planning activities (T-PLAN), setting objectives (T-ORE), providing support (G-SUP/ENC), encouraging innovative thinking (G-INNOTH), and delegating tasks to teachers (G-DELEGATE). Department chairs, although present and supportive, allowed the details of the change initiative to be determined by teachers. The balance between being available for support and allowing teachers to have more control was summarized by DC4: “I expect the work to be done. I’m not going to micromanage.”

During the TRY stage, department chairs supported teachers as they determined the details for the change and the change began to be implemented. During the EXTEND stage, department chair support involved planning situations (T-PLAN) that would be appropriate for the public recognition for the work, effort, and initial successes teachers had related to the change attempt (G-REC). This recognition served not only to energize and encourage teachers who were working on the change implementation, but also to entice other teachers to consider implementing the change in other areas as well. Teachers not involved with the change saw their colleagues succeeding, and they saw the

change as possibly being more worthwhile and feasible than they had previously.

This prompted the expansion of the change in larger segments of the system.

The RENEW Stage

During the RENEW stage, I expected to see celebrations based on the emphasis I've seen administrators give to this formalized form of positive reinforcement and recognition; however, department chairs in this study didn't seem to be interested in providing celebrations for their teachers. Some leadership literature mentions celebrations as a mechanism to tap into the emotions of system members (Fox & Amichai-Hamburger, 2001), but I have been unable to find research supporting this leadership strategy. In the cases within this study, department chairs and their teachers seemed to be satisfied with their ability to document their progress and successes, and continue forward by adjusting their change process efforts. The main activities described by department chairs involved their monitoring the change (T-MONITOR) and reporting results back to their departments (G-REC/ENC).

The evolution from the CARE stage to the RENEW stage found department chairs to be heavily involved and strategic in the beginning of the process, but the change process required them to eventually relinquish a large portion of control. DC1 describe her progression in the system during the entire change process in this manner:

To me it's like parenting: As that child begins to grow, you begin to pull back and back and back. In my professional learning teams, they don't need me anymore. I go into the meetings and ask, 'Do you have any questions, do you need anything?' and they look at me, like, 'Why are you here? We have work to do.' And that's a very fulfilling moment, but it's also a very sad because they don't need you anymore. What's my role now? You want to be there, you want to be part of it, and that's when you

need to step back. You going in there is disruptive, but you wonder, where is my place in it? That's hard. That was a transition for me this year. I'm no longer leading the charge.

The findings of this study support the general stages of Havelock and Zlotolow's (1995) CREATER model of the change process; however, their descriptions of the roles that change agents play during these stages were only partially supported by this study. This seems to be due to the overlapping and diffuse descriptions of roles as presented in their book, *The Change Agent's Guide*. Havelock and Zlotolow present four roles that change agents can play during the change process: The change process-helper, resource-linker, catalyst, and solution-giver. Some of these roles are described narrowly and lack overlap with other roles, such as the solution-giver and resource-linker, and yet others are described broadly and overlap with the other roles, such as the change process-helper. Based on this study, it appears that more specific change agent roles, as proposed in Chapters IV and V, seem to be consistently present in different stages of the change process. The possibility of more specific and discrete change agent roles associated with stages of the CREATER model, as well as with leadership behaviors as described by Yukl et al. (2002), may be an area for additional analysis and future research.

Change Stage Suggestions for Department Chairs

The following suggestions are based on the change process stage findings derived from successful and unsuccessful instances of change explored in this study. Each stage of the CREATER model explored in this study is addressed separately, and key leadership behaviors that were identified in the analysis portion of this study as described by Yukl et al. (2002) are reviewed.

- CARE stage activities are task-focused and continuous, and completed by the department chair on their own, not with department members. The end goal of the activities in this stage is to understand department strengths and weakness to better identify areas that might benefit from a change. This stage provides opportunities to increase the perception of the leader possessing expert power. The main roles department chairs play during this stage is that of an independent “researcher” and “strategizer.”
- Connect to and be aware of the larger, external context in which your department operates (T-EXTERNAL).
- Collect and analyze data on key functions of your department (T-MONITOR).
- Create coherent narratives on how external and internal factors are connected (T-REFLECT).
- Develop questions to explore how your department could better meet the needs of students through your departmental goals (T-PLAN).
- Listen to teacher ideas and concerns; different knowledge bases and experiences can provide valuable insight into the science education processes that occur, or could occur, in the department (G-CONSULT, T-MONITOR).
- The RELATE stage is continuous. Relationships are essential foundations from which tasks can be accomplished. Both task- and people-focused leadership behaviors are required during this stage; the end-goal of this stage

is to develop teachers' trust (G-TRUST) in their department chair, which will increase the perception of expert and referent power.

- Be present, be seen, and be available.
- Network with each teacher on a casual, personal level.
- Interact with each teacher on a professional level. Schedule structured individual discussions a few times a year to hear ideas on department effectiveness, their goals for their own professional development, and their philosophies on science education. Follow up on their professional growth to nurture teachers and to show interest in their thoughts on their role in the profession and the department.
- The EXAMINE stage has a specific beginning and ending point, and requires strategic planning (T-PLAN). Department chairs need to be attentive to subtle and non-subtle teacher feedback. The main role department chairs play during this stage of the change process is that of “catalyst.” This main goal of this stage is to spark teacher dissatisfaction with the status quo as it relates to the possible change topic and involved them in the decision-making process. Both task- and people-focused leadership behaviors are required during this stage.
 - When possible, avoid stating that a change is going to occur at the beginning of this stage.
 - Strategically provide professional development to teachers in the form of articles or internal and external data (G-PD).

- Ask questions related to the professional development relate to the possible change in casual discussions or during one-on-one meetings to determine initial teacher responses. Collect verbal and written, as well as group and individual, feedback from teachers (G-CONSULT).
- Allow teachers to have time to process the information (T-PLAN).
- Be open to teachers' abilities to identify barriers that would prevent a change (G-CONSULT).
- If teachers haven't become dissatisfied enough with the status quo, department chairs have three choices: (i) extend the EXAMINE stage to continue discussions on the area of possible change, (ii) abandon the change attempt, or (iii) if a small group of teachers is dissatisfied with the status quo and is interested in attempting a change, department chairs can move this small group onto the TRY stage.
- The TRY stage is marked by increased teacher involvement and control of the details of the change process; however, the department chair is still needed for support and organization of teachers' work. In this stage, the department chair assumes the role of change "process-helper." Leadership behaviors during this stage include a mix of task- and people-focused behaviors. By the end of this stage, details of the change should be determined.
- Set clear and achievable objectives and tasks for teachers to complete in teams, but allow teachers to determine the details of their work (T-ORE).

- Be present to provide encouragement and help when needed, but without being overbearing, strongly influential, or micromanaging (G-REC, G-SUP/ENC).
- Provide space, time, and resources. Arrange additional professional development as needs emerge (T-PLAN, T-MONITOR).
- Teachers continue to take more control of the change process during the EXTEND stage, and department chairs continue to play the role of change “process-helper.” A goal of this stage is to entice teachers who have not been part of the change process to consider participating in the change, and to encourage teachers who have been involved with the change to identify how this change could be expanded into other areas.
 - Check in with teachers who are involved with the change process to gather information on their progress, challenges, and successes (T-MONITOR).
 - Arrange time for teachers to share their progress with other teachers to solicit feedback and ideas, and to invite others to learn more about the change (T-PLAN).
 - Keep your distance. Allow teachers to take ownership of the change. Support them and provide recognition, but avoid interfering or micromanaging (G-SUP/ENC, G-REC).
- Department chairs change-related leadership behaviors increased and teacher-directed change activities decrease during the RENEW stage. Department chairs again play the role of “researcher,” but focus their attention specifically

on the areas of the change. Leadership leans towards task-focused behaviors, but people-focused behaviors are also important during this stage.

- Report out to the department the successes of the change attempt, as well as areas that may need additional refinement (T-PLAN, T-MONITOR).
- Recognize and appreciate the work and effort of teachers involved with the change attempt, and encourage them as they continually explore how to improve the change (G-SUP/ENC, G-REC).

Findings, Implications, and Recommendations

Related to Emergent Themes

Other findings that emerged from this investigation on how science department chairs lead change were not associated with Ely's (1990) conditions of change, Havelock and Zlotolow's (1995) CREATER model, nor Blake and McCanse's (1991) Leadership Grid. These themes were present in the majority of department chair stories, and represent unanticipated common aspects associated with leading change in secondary school science departments. The most prevalent of these tangential findings included the limited authority of the department chair position, department chair strategizing the creation of teacher teams, department chair leadership inventory (LSI) results, and the uncanny mentioning of, specifically, two chemistry teachers presenting resistance by five of the six department chairs.

Limited Power of the Department Chair

As literature has suggested, department chairs are often in a middle-management position that is also coupled with the expectation that the holder of the position display leadership (Gmelch, 2004; Hannay & Erb, 1999). This indicates that department chairs must oversee the smooth operations of their departments while instituting meaningful change. In secondary schools, department chairs who are interested in implementing change have limited power to compel poor or unmotivated teachers to change if they are satisfied with the current conditions. This lack of coercive or reward power limits the avenues department chairs have to promote meaningful change.

Although a few department chairs in this study released non-tenured teachers who were unable or unwilling to participate in change (an example of using coercive powers), department chairs spoke of their occasional struggle to convince resistant tenured teachers to see the benefit of possible changes. To reduce the systemic influence of resistant tenured teachers, department chairs either reorganized teams or waited for these teachers to retire. Only one department chair asked for help from his administration to address an uncooperative tenured teacher; however, despite the seriousness this involvement portrayed to the teacher, the administrator similarly lacked power to force change due to tenure policies. As this department chair stated, “We don’t have the current system for really getting rid of them in an effective manner, or in a quick manner. Hopefully with the new state evaluation system, this might change.”

Team Construction

This theme emerged when department chairs used task-focused leadership behaviors, such as monitoring their department and teams (T-MONITOR), planning how to strategically construct teams (T-PLAN), and setting clear objectives and role expectations for teams and teachers (T-ORE). As department chairs discussed leadership strategies during the change process, they spoke of the importance of having well-constructed content-area teacher teams. Many department chairs noted that teams needed to have a leader that the department chair could trust to guide the team in a manner that aligned with unstated department philosophies and goals. When team progress suffered due to a poor mix of personalities, or a particularly negative teacher, department chairs either reorganized teams, released teachers if they were non-tenured, or joined the team themselves. Shuffling teachers to other teams was a strategy that department chairs used to reduce the impact of resistors and promote curricular development.

When I shared the idea that department chairs clearly strategized team construction, DC8 and I decided to brainstorm together about one of his teachers, considering which team this teacher could be assigned to allow her current team time to heal and make progress on their change initiative. Unfortunately, each team we considered seemed too fragile to handle her negative effects; as this department chair explained, each team we discussed “hates” her. He lamented, “I don’t know where to hide her.”

Leadership Characteristics

The Lifestyles Inventory (LSI) measures an individual's thinking patterns based on how they perceive others in their system (Lafferty, 1989). The LSI presents three main clusters of thought-patterns, and these clusters each consist of four thinking styles. A circumplex arranges these 12 thinking styles based on an individual's desire to meet their satisfaction needs or their security needs, and if they attempt to meet these needs through interactions with people or through completing tasks. Figure 2 shows the arrangement of the circumplex, along with descriptions of each thinking style.

As a collective, department chairs in this study scored admirably on their leadership measurement survey. This survey indicated that the department chairs in this study generally scored above the norm in the positive Constructive cluster leadership thinking patterns, and below the norm in the two negative clusters of leadership, Passive-Defensive and Aggressive-Defensive. Although most department chairs in this study were not trained extensively in leadership, they did display characteristics in common that may have led to this generally and collectively positive LSI profile.

Common characteristics that may have contributed to the generally positive LSI profiles of these department chairs begins with the fact that department chairs in this study applied for their current positions of leadership, indicating that they felt they had the qualities necessary to lead a department effectively. An administrative team who saw leadership potential in them then hired them to chair a department, again indicating that they exhibit leadership qualities. Additionally, these department chairs volunteered for this study on leadership, which leads to the possibility that these specific department

chairs were interested in learning more about their leadership and the leadership of other department chairs, which further suggests that they felt confident in their leadership abilities to explore their abilities honestly. Although most department chairs in this study expressed doubts on how they handled certain leadership aspects of their job, their level of confidence allowed them to be vulnerable and share their doubts without retreating to a defensive position. This combination of administrative recognition of their leadership capabilities, along with their own assessments and reflections on their leadership, possibly predicts that they would score well on the LSI.

Other common characteristics shared by these department chairs that may have contributed to their LSI scores included that they had strong science backgrounds, with most having undergraduate degrees in the sciences. Additionally, they had all been at one time, or were currently, high school teachers, and they all had been department chairs for over six years. This background combining science and teaching could possibly be used to forecast a predilection towards the Humanistic-Encouraging, Self-actualization, and Achievement-related thought patterns, all of which are found in the Constructive cluster of thought patterns. In addition, their years of experience in their department chair position provided them with the opportunity to learn their leadership strengths and weakness, which may have predicted their lower than normal Passive-Defensive cluster of thought patterns. Finally, their gravitation towards the field of education, along with their years of teaching experience, may have led to the expectation that they would score low in Aggressive-Defensive cluster of thought patterns.

Department chairs within this study generally scored above national norms in the Constructivist cluster of leadership styles; however, scores for Avoidance and Dependence within the Passive-Defensive cluster were slightly higher than the others, although still lower than national norms. These two areas may illustrate a common characteristic of the department chair job: Secondary school department chairs have little power to compel teachers to change, and teachers must accept most changes if the changes are going to be successful. This leadership position with limited power prompts department chairs to affect what they can while leaving other issues alone, and to understand that they rely on teachers to cooperate or compromise so changes can be implemented.

Although there were common profiles in the LSI scores of these department chairs, there were some exceptions. One department chair scored exceptionally high on the Constructive cluster, and exceptionally low on her Passive-Defensive and Aggressive-Defensive clusters. These scores indicate that she had the thought patterns of an extraordinary leader; these scores not only reflect her advanced training leading to her superintendent certification and doctoral work, but also her innate leadership abilities and her years of experience as an educational leader. This LSI profile was also reflected in the story of change she shared for this project.

Another department chair scored outside of the common profile of the department chairs in this study by scoring higher in his Passive-Defensive and Aggressive-Defensive cluster. Possible explanations for this include the fact that he was working in a highly contentious department where his teachers were openly hostile to his leadership attempts.

Simply speaking with this department chair, these defensive thought patterns were not very noticeable, although the level of contention as described in his story was striking and his struggle with this contention was obvious.

Chemistry Teachers

A surprising trend emerged from the conversations I had with department chairs during their interviews: Although resistance was apparent in teachers from various content area teams, five of the six department chairs mentioned that chemistry teachers presented resistance, even when the change initiatives were not centered on their team.

When I shared this with the one department chair who did not report difficulties with chemistry teachers, she wondered if her lack of difficulties with her chemistry team was because she had started out as a teacher on that team: “Maybe it’s not the chemistry team, because their DC came from the chemistry team here. For me, it (resistance) was my bio group.”

Although this theme of chemistry teachers seeming to be more consistently resistant to change was a curious finding, I feel that it is important to emphasize that in this study, resistance was mentioned associated with teachers who taught in a variety of content areas. However, this theme of resistance connected with chemistry teachers may indicate a possible correlation between teachers who are attracted to this content area, which is comparatively contained, predictable, and potentially dangerous compared to other science fields, and how these teachers view change.

Suggestions for Future Investigations

Suggestions for future studies emerged from two sources: Limitations of this study and findings uncovered by this study. Individual projects investigate focused research questions with the goal of determining clear answers to these questions; therefore, other interesting questions or variables are sacrificed for the sake of a disciplined approach to research. The questions and variables that were not part of the current focus remain and provide additional areas of investigation that can use the background and foundation of this present study. Additionally, the findings of this current study stimulate further questions and variables that may enhance the full picture of leadership and change.

Many additional, topically relevant ideas and questions were not investigated by this study; this is somewhat due to this study's focus, but also due to the participant selection process. Department chairs in this study were purposefully chosen based in part on their years of experience in education and their years of experience as a department chair. This purposeful selection provided department chairs who were reflective and experienced, and these characteristics allowed the investigation of a more consistent perspective on how experienced science department chairs lead change. However, it would be interesting to investigate the learning curve of department chairs on leading change. One research question based on this idea of a learning curve could be, what are the behaviors, strategies, and reflections of less experienced department chairs compared to experienced department chairs when approaching the change process? The areas that differ between the novice and the expert department chair could be used for professional

development purposes, increasing efficacy and comfort of newer department chairs.

This study could take a similar approach as this current study however it would consist of differently selected participants.

Although not a selection criteria of this study, department chairs in this study did not represent the average department chair from average schools. Most department chairs in this study were from middle class or affluent areas; in addition, department chairs self-selected for this study. The first factor indicate that the department chairs in this study may have more resources at their disposal, as well as the ability to attract more competent teachers due to pay scale offerings and school reputations. The second factor indicates that these department chairs have confidence in their leadership skills, and might possibly be more reflective than the average department chair who completed the online selection survey, but who did not volunteer to participate further in this study. How would average department chairs, many of whom would possess less access to resources or highly qualified teachers and who may have less confidence in their leadership abilities, lead during the change process? What barriers would they encounter, and what mechanisms would they use to overcome these barriers? Findings from this study could result in professional development opportunities that would be more applicable to the general population of department chairs. This type of study could again take a similar approach as the current study, but with a different focus for participant selection.

Research questions for future studies that fall along similar lines of this current study include: Do department chairs know what they need for professional development

for their own work? In addition, how do department chairs receive professional development related specifically to their department chair duties? Department chairs in this study often sought professional development on their own, more through reading literature on leadership within the business world and less from literature on educational leadership. As DC7 stated, “I read management books, not education books, I think they’re more relatable to what this job entails.” Additionally, department chairs in this investigation stated that one reason they chose to participate in this study is they wanted to learn more about their department chair positions, and how other department chairs handled various situations. From my conversations with these department chairs, and from my own experiences, although individual department chairs are interested in learning more about their positions and how they can increase their effectiveness, but there is scant literature specific to their positions to guide them with this learning. Future research focused on determining what secondary school department chairs feel they need to know, and then creating mechanisms for providing this knowledge, would enhance how education is reformed and delivered within school classrooms. Again, this type of study could follow a similar approach as the current study, but with research questions focusing on professional reflection and development.

Another line of research could examine the role of administration in the process of department chairs leading change. Part of this future research could compose research questions that also focus on how administrators view the roles of department chairs, and what they expect department chairs to accomplish. From my conversations with department chairs in this study, it seems that administrator are largely absent from the

day-to-day activities of department chairs. Although, some stories of change within this study were initiated by administrative mandate or suggestion, it was the department chairs in these cases who were expected to carry out the change process with their teachers. This middle-management position matches descriptions found in literature on department chairs roles and duties (Gmelch, 2004; Hannay & Erb, 1999). Department chairs are occasionally asked implement changes within their departments that may or may not have teacher support; therefore, department chairs are placed in positions where they need to encourage dissatisfaction with the status quo in order to carry out administrative initiatives. They also need to have established their leadership power based on one or more of the following types of relationships with their teachers: Legitimate, referent, or expert. In only one story of change within this study were administrators described as helping department chairs with the change processes; in all other stories of change within this study, department chairs were expected to lead their departments through change processes without the aid of their administration. This investigation would entail interviewing administrators and department chairs to determine whether there was a congruent view of what department chairs were supposed to do, how they were supposed to it, and what the role administration could play as supports to this role.

The final area of topics for future studies focuses on the main source of resistance, as well as the main source of progress, during the change process: the teachers. In all but one case, teachers were the point within the system that expressed resistance to change. In addition, in all successful cases of change, teachers were the creative forces that

refined, designed, and produced innovative changes. As department chairs hire new teachers, how can they better screen applicants so that they hire individuals who are i) interested in constantly growing professionally and searching for better ways to reach kids, ii) open to change and innovative thinking, and iii) able to work collaboratively with others? Can these questions be answered through interview screening techniques? And, once hired, is there an evaluation system that would work to screen out uncooperative teachers or teachers who just “don’t get it?” Although these questions are not formulated as research questions, they are large overarching questions that directly affect department chairs’ abilities to enact meaningful change in their departments.

Researcher Reflections

My interest in this research project was sparked by my most recent change attempt that inverted the sequence of science courses from a traditional, multi-optional series of courses, to a strategically aligned sequence of courses. Our department describes this sequence of courses as a modified-PCB sequence, which begins with a Physics Honors or GeoPhysics course during students’ freshman year, followed by Chemistry their sophomore year, and continuing on to Biology their junior year. I had implemented curricular changes as a department chair at two previous schools, but this reversal of the course sequence was the most ambitious change I had contemplated, and based on my previous experiences with resistant teachers, I realized that a change of this magnitude needed to be approached carefully. My cautious attitude prompted me to read change and leadership literature, confer with other department chairs in my school, and seek advice from other science department chairs in my area. As I learned more about

leadership and change from this research and conversations, the more I realized how important these topics are to the job of secondary school department chairs.

As I collected and analyzed data from this current investigation on how science department chairs lead change within their departments, I reflected on my own experiences with leading change, and I found many commonalities with the department chairs in this study. I also identified behaviors and ways of thinking expressed by these department chairs that I plan to use in the future as I approach new situations with my department. Some common threads I found between the stories explored in this study and my own experiences include similar leadership behaviors during different stages of the change process and in response to change process barriers, comparable difficult interactions with contentious teachers, and a similar recognition of the importance of strategizing team membership.

One leadership behavior I'm most interested in, and a leadership behavior that was common throughout this study during the EXAMINE stage, is the strategic sharing of information designed to prompt teachers to come up with an idea that the department chair already has in mind. In this study, department chairs often strategically shared information to open teachers' minds to see situations in a new perspective, and then used this new perspective to provoke teachers into seeing a possible need for a change.

Prior to changing our course sequence, my department faced the challenge of determining how to appropriately place students in various freshman courses, and we struggled with aligning content from one progressive course to another. Our department faced other challenges as well, and the combination of these issues clouded the ability of

teachers to see related threads that could be addressed with a single change. My work collecting department data and educating myself on current trends in science education during the CARE stage, along with my previous experiences in other schools, led me to wonder if a course sequence change would help with a few of these issues. Being only recently hired, I realized that sharing this change idea outright with teachers would provoke immediate negative feedback, and perhaps permanently close the opportunity to explore this idea. I instead chose to share information in a strategic manner that slowly opened teachers' minds to the idea of a course sequence change. Although I felt confident of this idea of change, I knew that pushing the issue would not result in teachers considering a course sequence change. I needed teacher buy-in for this idea to have a chance at success, and therefore I needed to provide teachers with information that would set the stage for them to see the opportunities that a course sequence change might provide our department.

To begin this process with my teachers, I used the information I learned during the CARE stage, along with teacher feedback on their ideas of what our department should focus on, to create department goals. These department goals were then shared with the department for teacher feedback. These goals provided a focusing framework in which information was strategically presented during the EXAMINE stage to promote teacher openness to the idea of change. Interestingly, department goals was one area that participating department chairs didn't mention in their interviews or in their documents; instead, department chairs in this study seemed to rely on the general visions of "best practices" and "doing what's best for kids." In my experience, being able to discuss

issues and information within the framework of our department goals helped to keep our department focused. New information within our field is constantly emerging, and we were able to evaluate new information based on our department goals to determine whether we should pursue a new change initiative based on this information, or if we should place this information and related changes on hold until we had first achieved our original goals.

Collecting and organizing information designed to promote critical thinking and opening minds to the idea of change is a time intensive and tactical activity. The upfront time and effort in this activity, however, sets the foundation for successful change. When selected information is organized and presented in a logical manner, and teachers are given time to consider the information, they often come up with change ideas that either match department chair's unstated ideas, or they suggest ideas that improve the department chair's unstated change ideas, or they provide insights into why certain change ideas would fail. This feedback helps department chairs understand the predispositions of their teachers and allows them to see other unconsidered options. This study determined that hearing and correctly interpreting teacher feedback at this time was crucial to department chair attempts at leading change; when department chairs failed to hear the voices of all of their teachers correctly, they often progressed with a change that eventually was unsuccessful.

As my teachers discussed the information I shared during the EXAMINE stage within the framework of the department goals, they generated ideas, many on course sequences. Through department discussions, one-on-one conversations, and anonymous

written feedback, I was able to determine that most teachers in the department agreed that a sequence change would be beneficial, although intimidating. Receiving feedback from teachers in multiple forms was a common behavior described in department chair stories of successful change, and paying close attention to this feedback appears to be a crucial step that differentiates successful changes from unsuccessful changes, as well as unsuccessful changes that end naturally and respectfully versus unsuccessful changes that end with hurt feelings and damaged relationships.

Once a majority of teachers was on board with the idea of exploring a change in our course sequence, we progressed to the TRY stage. During this stage, teachers explored various course sequences that might address issues identified and refined during the EXAMINE stage by reading literature, visiting other schools, and brainstorming hybrid designs. I arranged, facilitated, and participated in activities; however, I often let teachers work on their own in teams to discuss details of the change. Teachers exploring these sequencing possibilities shared their ideas with the department, and we eventually and cautiously decided that a move to a modified Physics-Chemistry-Biology (PCB) sequence would have the most potential to meet our department goals. Interestingly, this PCB sequence would not have been the sequence I would have chosen at the start of this change attempt, but feedback from my teachers allowed me to see this more appropriate option. In this process, my teachers played an instrumental role in refining and adjusting our change efforts, which enhanced our chance for a successful change.

We implemented this course sequence change by student cohort, beginning with the freshmen entering our school in 2008. As this first student cohort progressed through

their high school years, each grade-level team teachers created and refined their new curriculum. As these teaching teams finished drafts of their work, they shared their overall progress with the department during the EXTEND stage, which uncovered additional areas of alignment and sparked innovative thinking in their peers.

Data was collected throughout the years of our implementation, and I was able to present small glimpses of how our change was impacting our departmental goals, but data on how the change impacted large goals would not be available until the first cohort, which entered in 2008, had graduated in 2012. Therefore, our RENEW stages have been intertwined with our EXTEND stages. Similar to the department chairs in this study, I have been cautious about celebrating data early in our change implementation process simply because I, and my teachers, realize that educational data results from various variables and therefore any positive or negative results may or may not be from the change focus. However, after a few years of consistent data, we have begun to accept, and feel proud, of the fact that our change, and the hard work that accompanied this change, is having positive impacts on our departmental goals.

In addition to my experiences and reflection on the change process, I was fascinated to learn how many department chairs had faced contentious teachers. A common theme found among these contentious teachers was that they had either (i) been a department chair in their current school but had stepped down or (ii) had applied for the current department chair position, but were not chosen for the position. As the department chairs within this study who were experiencing, or who had experienced, overt and covert resistance based on teacher dissatisfaction with the department chair, I

also experienced contentious behavior when I was hired to be the department chair at a previous school over another internal candidate. As these department chairs shared, it was one of the most difficult professional challenges I had faced in education. In the stories shared by department chairs, and in my own situation, I have been surprised that administration appears to not be able or willing to intervene with these situations, despite the fact that they have more authority to set expectations and influence the behaviors of dissatisfied teachers.

Another common experience I shared with these department chairs is using team construction as a strategy for responding to difficult or less competent teachers, or for responding to conflicting personalities. Each team needs a leader and people who can contribute to the development of the course. Individuals who are not able or willing to contribute to the functioning of a team need to be spread out among teams, or assigned courses that do not work on a team model. Occasionally, very talented and creative teachers also have a difficult time working with each other because of their inability or unwillingness to compromise with one another's ideas. A poorly constructed team, which sometimes cannot be avoided due to the personnel that are present and their certification areas, can create less than optimal experiences for students and their colleagues, and more issues arise due to interpersonal conflicts and diversity in the lessons they teach. Although I work to create teams that run smoothly and that efficiently develop and enhance their curriculum, it is difficult to find a good fit for everyone. In the past, like other department chairs in this study, I have released non-tenured teachers who are unable to fit in and contribute to their teams; however, tenured teachers who exhibit

these same limitations are difficult correct. When I interview people for teaching positions in my department, the ability to fit into a team, or to meet a team's needs, is close to as important as their ability to connect with and teach students.

Finally, when I consider my experiences as a department chair, and when I think about how I would like to continue to develop my leadership abilities in the future, another aspect from this research that I will take with me is not only the information learned about leadership and change, but also the human experience that was evident in department chair stories and reflections of their work. The vulnerability they expressed when leading their departments through change, and the self-doubt they felt when challenged in unexpected ways, normalize my own feelings I attempt to make changes within my department. Too often, I feel that popular leadership literature portrays leaders who have uncompromising confidence, and despite the high-level of accomplishments and respect afforded to many of the department chairs within this study, their human side was evident, as all expressed occasional self-doubt and internal struggles. Their sharing of these feelings was a gift to me and to the other participants in this study. My hope is that it will also be a gift to other leaders who work for change in difficult situations; it might normalize their feelings and encourage them to continue with their pursuit of change for the benefit of their students and the system in which they work.

Conclusion

My experience with the challenges of leading successful change initiated my interest in this research project, and in many general and specific ways, my experiences mirror those of the department chairs in this study. On the general side, the department

chairs in this study understood that, as Lee (1987) and Leithwood (1994) described, the department chairs in charge of managing the smooth operations of their departments, and is expected to lead meaningful change within their departments. However, as department chairs, we have little coercive or reward power, and therefore, we must rely on specific leadership skills if we are to enact curricular or program changes (Tucker, 1993). This delicate position coupled with the leadership expectation prompted me to question: How do department chairs lead change?

As I explored the literature on leadership and the change process, I realized that this investigation might not only enhance my understanding of the role I play in bringing about change in science education, but it may also add details to the bridge that connects these two interdependent constructs. This connecting bridge has not been clearly constructed in the currently available literature. As Herold et al. (2008) stated, “[O]rganizational change studies have examined leadership behaviors during specific change implementations yet have failed to link these to broader leadership theories.”

The findings of this study help to uncover some details of this link between specific change models and specific leadership theories. This study also offers descriptions of, and insight into, a specific milieu that might further our understanding of the complex relationship between leadership and change as experienced by secondary school science department chairs. More specifically, this research used these stories of successful and unsuccessful change to:

- Add validation to:
 - Ely’s (1990) conditions of change

- Havelock and Zlotolow's (1995) CREATER model of change process stages
- The flexible use of Blake and McCanse's (1995) Leadership Grid
- The leadership behaviors as described by Yukl et al. (2002)
- Connect stages of the CREATER change process model (Havelock & Zlotolow) with The Leadership Grid (Blake & McCanse) and Yukl et al.'s leadership behaviors
- Connect the absence of Ely's conditions of change, viewed in this study as change process barriers, with specific leadership behaviors as described by Yukl et al.
- Identify Ely's condition of "dissatisfaction with the status quo" as the critical condition needed for successful change
- Identify Ely's conditions of knowledge and skills and participation in decision-making as helpful to change attempt success
- Identify the EXAMINE stage of the CREATER model as the critical stage in which leaders' interpretation of followers' perceptions determine the future climate of the change attempt
- Describe how secondary science department chairs experience and adjust their leadership strategies and behaviors in response to barriers to the change process and change process stages
- Infer why secondary science respond to change process barriers and change process stages with specific leadership behaviors

- Led to suggestions for department chairs as they consider change initiatives, as well as to suggestions for administration as they help department chairs with their responsibilities

Although the findings of this study contribute to the literature on the change process, leadership, and the connection between these two constructs, much of the heart of this study lies with its subjects: Secondary school department chairs. These individuals are the content experts in their buildings, and they have the ability to understand where reform may enhance students' experiences of learning. Department chairs, as illustrated in this study, are also in isolated positions, and they face not only the challenges of daily work within schools, but they frequently face challenges presented by members of their department. Viewing school systems from a wide perspective, it appears that department chairs have the ability to adjust teaching and curriculum in powerful ways; however, the barriers they face can overwhelm their ability to enact change.

This research stresses the promise of research and professional development. Based on this study and the work of many others in the field, department chair professional development may help lessen their isolation, contribute to their understanding of the role they play within school change, and increase their effectiveness. Professional development could also more specifically enhance department chairs' abilities to strategize effective leadership behaviors when encountering barriers to change and as they approach different stages of the change process. Department chairs in this study were clear: They wanted to chaperone change that would benefit their students.

This study, combined with general change and leadership literature, could provide points for professional development that not only enhances the experiences of department chairs in their work, but also promotes departmental change that positively impacts the lives of students.

APPENDIX A

LISTSERV EMAIL FOR RECRUITMENT AND INVITATION TO

THE ONLINE SELECTION SURVEY

To: Members of the Illinois Science Educator Leaders Association (ISELA)

Subject line: Request: Participation in a 3-15 minutes survey for a dissertation project

Hi all!

I'm beginning my dissertation research through Loyola University Chicago, and I'm working on selecting individuals that might help me better **understand the process through which science department chairs lead change** within their department. My hope is that the results of this study might point towards recommendations about how leaders should approach the change process, hopefully resulting in increased student achievement in science and improved school experiences.

If you have as little as 10 minutes to help with this process, please consider clicking on the link below. This link will connect you to an online survey that will help me connect with individuals who might be interested in participating more with this study on how change within science departments happens.

INSERT LINK

This survey is confidential, and you won't be contacted unless you volunteer your contact information. No IP addresses will be identified and all information will be encrypted. If you have any questions about this research or about this survey, please feel free to contact me at jgaubatz@hinsdale86.org.

Thanks – I really appreciate your time!

Julie Gaubatz
Science Department Chair
Hinsdale South High School
630-468-4500

APPENDIX B

ONLINE SURVEY FOR THE SELECTION OF PARTICIPANTS

Sci DC - Change Process	Sci DC - Change Process
<p>Consent Page</p> <p>Thanks for considering taking this quick survey! You have been invited to take this survey due to your membership in ISELA and/or ISTA.</p> <p>For some participants, this survey will take as little as 2 minutes. For other participants, this survey may take as many as 10 minutes. Depending on your answers, this survey may consist of as many as four screens that contain questions, with screen three being the most involved.</p> <p>This survey will help the author, Julie Gaubatz, a doctoral student at Loyola University, select cases for further research into how curricular and instructional change occurs in science departments. This project has been IRB approved and is being supervised by Dr. David Ensminger (312-915-6660).</p> <p>There are no foreseeable risks involved in participating in this survey. There are also no direct benefits to you from your participation; however, the results of this study could point towards recommendations about how leaders should approach the change process, leading to increased student achievement and improved school experiences.</p> <p>Your participation in this survey is voluntary. You may choose not to participate and you may withdraw at anytime during this survey without penalty. You may move back screens to edit your answers, and you may also click on the "exit this survey" link at the top right of the survey from any page.</p> <p>All responses will be anonymous unless participants volunteer their contact information at the end of the survey. Anonymous responses will be not be retrievable from the database by the researcher should the participant wish it withdrawn. No IP addresses or other identifying information will be collected, and you do not have to provide any personally identifying information. All responses to this survey will be encrypted to further protect confidentiality. Confidentiality will be maintained to the degree permitted by the technology used. Your participation in this online survey involves risks similar to a person's everyday use of the Internet. Only Julie Gaubatz will have access to your survey answers, and they will be secure deleted at the end of this project.</p> <p>If you have any questions about this research study, please contact Julie Gaubatz at jgaubatz@hinsdale66.org. If you have questions about your rights as a research participant, you may contact the Loyola University Office of Research Services at (773) 505-2659.</p> <p>Thanks again for considering taking this quick survey on curricular and instructional change within science departments.</p> <p>*1. ELECTRONIC CONSENT: Please select your choice below. Clicking on the "agree" button indicates that: - you have read the above information - you voluntarily agree to participate in this survey If you do not wish to participate, please decline by clicking on the "disagree" button.</p> <p><input type="radio"/> Agree <input type="radio"/> Disagree</p>	<p>Your role at your school and change</p> <p>*2. What is your professional role at your school? You may choose more than one answer.</p> <p><input type="checkbox"/> Teacher <input type="checkbox"/> Lead Teacher/Team Leader <input type="checkbox"/> Department Chair <input type="checkbox"/> Division Head <input type="checkbox"/> Curriculum Director <input type="checkbox"/> Prefer not to respond Other (please specify): _____</p> <p>*3. Have you guided, or are you currently guiding, a curricular or instructional change within your science department?</p> <p><input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Prefer not to answer</p>

Sci DC - Change Process	Sci DC - Change Process
<p>A little professional background information</p> <p>*4. Are you tenured in your current position?</p> <p><input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Does not apply <input type="radio"/> Prefer not to answer</p> <p>5. How long have you been working for your current district?</p> <p><input type="radio"/> 0-5 years <input type="radio"/> 6-15 years <input type="radio"/> 15 or more years <input type="radio"/> Prefer not to answer</p> <p>If you'd like to elaborate your answer, you may do so here. _____</p> <p>6. How many years have you been in your current position?</p> <p><input type="radio"/> 0-5 years <input type="radio"/> 6-15 years <input type="radio"/> 15 or more years <input type="radio"/> Prefer not to answer</p> <p>If you'd like to elaborate your answer, you may do so here. _____</p> <p>7. How long have you been in the field of education?</p> <p><input type="radio"/> 0-5 years <input type="radio"/> 6-15 years <input type="radio"/> 15 or more years <input type="radio"/> Prefer not to answer</p> <p>If you'd like to elaborate your answer, you may do so here. _____</p>	<p>Descriptions of successful and unsuccessful changes</p> <p>Some change attempts within science departments are viewed as successful, while other change attempts are viewed as not successful.</p> <p>For example:</p> <ul style="list-style-type: none"> - A successful change might be when a department flipped the sequence of courses - most of the goals of the change were met and most teachers participated. - A moderately successful change might be integrating reading skills into the curriculum - some of goals of the change were met, about half of our teachers participated to a certain level, and about half of our teachers did not. - An unsuccessful change might be when teachers were encouraged to check out professional development books and share what they read with the department - about 10% of teachers did this to a modest level, but most teachers did not. <p>While answering the questions on this page, consider changes you have guided, or are currently guiding, that you feel are successful as well as those that you feel are unsuccessful.</p> <p>8. Take a moment and think about changes you have led or are currently leading, with the understanding that some change attempts are successful and other change attempts are not. Such is the nature of change in schools.</p> <p>Briefly describe recent changes you have guided, or are currently guiding, for the science department at your school. There are two spaces for changes that you feel have been successful, and one space for a change that you feel wasn't successful.</p> <p>You do not have to fill in any or all of the boxes.</p> <p>Successful Change 1 _____ Successful Change 2 _____ Unsuccessful Change 1 _____</p>

Sci DC - Change Process

9. Based on the answers you listed above, please answer the following questions for each change you listed. Feel free to skip questions if you'd prefer not to answer.

	What percent of your grade were met by this change?	What percent of the change is complete at this point?	How would you describe the origin of this change?	How many of teachers were involved in the change?	Approximately how many teachers have "bought into" this change?	Would you recommend this change to other science departments?
Successful Change 1	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Successful Change 2	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Unsuccessful Change 1	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>

If you'd like to elaborate your answer, you may do so here.

Sci DC - Change Process

Thank you!

Would you be interested in sharing more of your experiences with leading change in science departments?

10. Leading change can be a challenging endeavor, and this research project is designed to learn more about how leaders bring about change within science departments.

This survey has been designed to help the author, Julie Gaubatz, select individuals that might be able to shed more light onto this process of leading change. This study requires Julie to interview individuals who have had successful experiences leading change as well as individuals who have had experiences with change attempts that have not been successful. If you'd be willing to discuss your experiences with and reflections on change attempts in science departments, it would be a great help to this study. Hopefully this study will provide insights that can help with future attempts at changes within secondary school science departments.

If you'd be willing to share your experiences with change attempts within science departments, please add your contact information below. However, by adding your contact information here, your answers will no longer be anonymous, although your information will still be encrypted so that only Julie Gaubatz will be able to see your information.

Thanks so much for considering sharing more of your story of leading change within high school science departments!

Feel free to add your contact information here (name, phone number and/or email) if you'd be interested in sharing more of your experiences with leading change in science departments:

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VITA

Julie A. Gaubatz is the daughter of Carolyn and David McLachlan. She was born in Ames, Iowa on July 18, 1970. She resides in Chicago, Illinois with her husband of 19 years, Michael Gaubatz.

As a child, Julie attended public and private schools in a number of states, and graduated from Bishop Miege High School in 1988. She earned her B.S. in Biology at Maryville University in St. Louis, during which time she also conducted medical research at St. Louis University. She continued her studies in the sciences and earned her M.S. from Northwestern University in Cellular and Integrative Biology. In 1995, she began her teaching career at The Briarwood School in Houston and earned her M.Ed. in Curriculum and Instruction at the University of Houston. She became the Math and Science Department Chair at Briarwood in 1996, then continued her teaching and science department chair role at Taft High School in San Antonio from 1998-2004. In 2004, Julie and her husband returned to Chicago, where Julie earned her Type 75 certification, and continued teaching and serving as the science department chair at Hinsdale South High school. She began her work on her doctorate at Loyola University Chicago in 2005.

Julie has multiple presentations and publications in the sciences and education, and has served various leadership roles in these fields, such as Vice President of the Illinois Science Teacher Association. Her future goals include continuing her work in the areas of science education and leadership.

DISSERTATION COMMITTEE

The Dissertation submitted by Julie A. Gaubatz has been read and approved by the following committee:

David Ensminger, Ph.D., Director
Assistant Professor, School of Education
Loyola University Chicago

Ann Marie Ryan, Ph.D.
Associate Professor, School of Education
Loyola University Chicago

Dan Surry, Ed.D.
Professor, College of Education
University of South Alabama